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SDB 206 and FF 313

User's Manual



E.H. Wachs Part No. 56-MAN-01
Revision B
September 2013

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EU DECLARATION OF CONFORMITY
WITH
COUNCIL DIRECTIVE 2006/42/EC

Issue Details:	DATE: 1/1/2011	Place: E.H.Wachs, Lincolnshire, IL USA
Directives:	Machinery Safety Directive 2006/42/EC	
Conforming Machinery:	<u>End Prep and Flange Facing Machines:</u> Model TSE, FSE and TFS Tube and Fitting Squaring Machines Model SDB 103, SDB 206, and SDB 412 Small Diameter Bevelers; Model FF 206, FF 313, and FF 424 Flange Facers. Model SB, LB, and MB Plus Boiler Tube Bevelers. EP 424 End Prep/Flange Facer.	
Model Number:	18-000-XX (TSE, FSE); 19-000-XX (TFS); 16-000-XX) (SDB-103/FF-206); 56-000-XX (SDB-206/FF313); 66-000-XX (SDB-412/FF-424); 70-000-XX (SB); 71-000-XX (MB Plus); 72-000-XX (LB); 81-000-XX (EP 424).	
Serial Number:		
Manufacturer:	**E.H. Wachs** 600 Knightsbridge Parkway Lincolnshire IL 60069 USA	
Responsible Representative:	Orbitalum Tools GmbH Josef-Schüttler-Str. 17, 78224 Singen Germany Tel. +49 (0) 7731 - 792 872 Fax +49 (0) 7731 - 792 566	
Harmonised Standards & Other Technical Standards/Specifications Applied or Referenced:	EN ISO 12100-1:2003 + A1:2009 EN ISO 12100-2:2003 + A1:2009 EN 60204-1:2006 (for electric machines) EN ISO 13857:2008 EN 982:1996 + A1:2008 (for hydrailic machines) EN 983:1996 (for pneumatic machines) EN 13732-1:2006 EN ISO 14121-1:2007 EN ISO 13850:2008 (for pneumatic machines)	
Provisions with which Conformity is Declared:	Essential Health and Safety Requirements of Annex 1 of the Machinery Directive	
We hereby certify that the machinery described above conforms to the provisions of Council Directive 2006/42/EC on the approximation of the laws of the Member States relating to the safety of machinery.		
Signed:		
Signatory:	Pete Mullally Quality Manager E.H. Wachs	

Introduction to the Equipment

The SDB 206/2 is a hand-held beveling machine for fast, accurate weld preps on pipe and tube from 2.27" inside diameter (I.D.) to 6" outside diameter (O.D.). It can machine pipe or tube with wall thickness up to 0.75". The machine clamps to the I.D. of the pipe being machined using a three-leg mandrel design for square, rigid installation. Different sized clamp legs are used to cover the machine's entire range of pipe diameters.

Machine Description

Figure 1-1 illustrates the main components of the SDB 206.

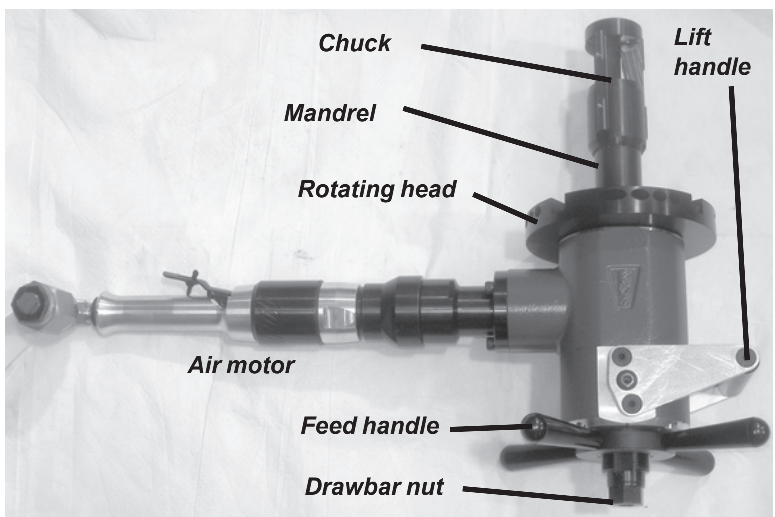


Figure 1-1. The photo illustrates the components of the SDB 206.

Rotating Heads and Mandrels

The rotating head is equipped with four tool holders that allow up to four form tools to be used simultaneously. You can face, bevel, and counterbore in one machining operation. Once you have configured the tooling for a particular pipe size, you can easily move the machine from one pipe to the next with no additional setup required.

Three different sized rotating heads and four styles of mandrels are available with the SDB 206. The three rotating heads are shown in Figure 1-2. The standard mandrel is shown in Figure 1-3.

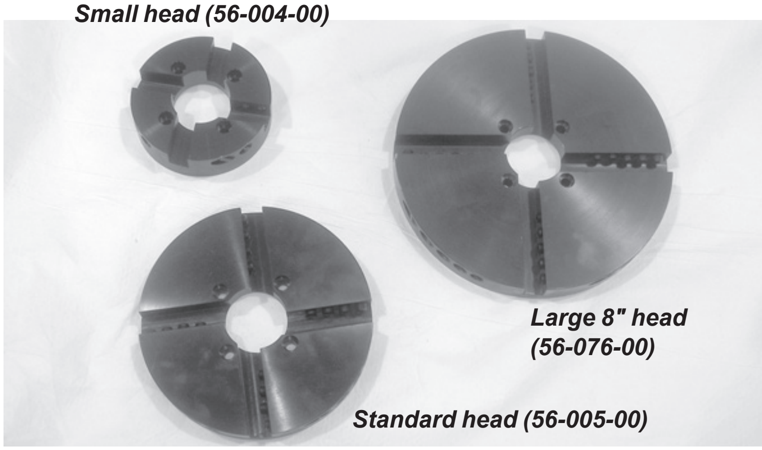


Figure 1-2. The photo shows the three rotating heads available with the SDB 206.

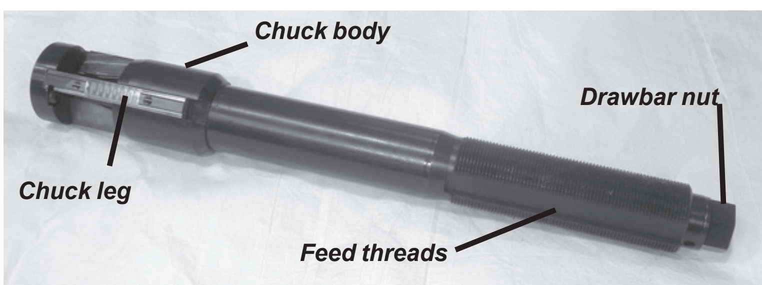


Figure 1-3. The photo shows the SDB 206 mandrel.

Mechanical Drives

The SDB 206 has two mechanical drives: cutting rotation and feed. The standard cutting drive for the SDB 206/2 is a 2.5 HP air motor. Optional electric and hydraulic drives are also available.

The feed drive is manually operated using a convenient handle. A feed index gauge provides precise feed measurement.

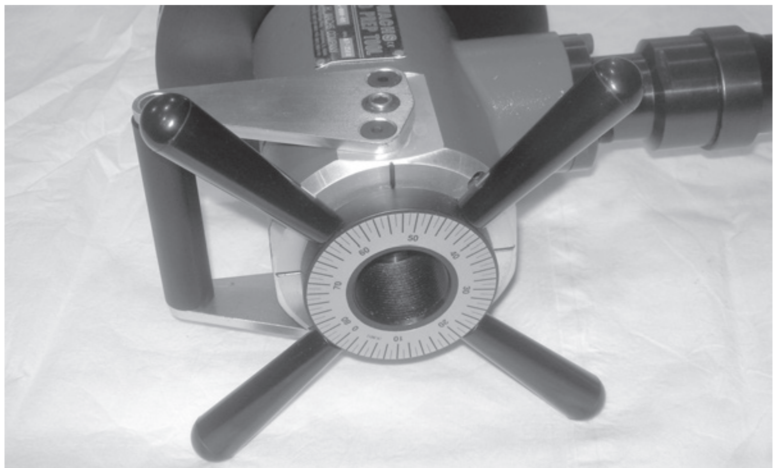


Figure 1-4. The feed drive includes a four-post handle and a gauge for measuring feed distance.

Clamping Legs

The standard chuck legs built into the mandrel allow an I.D. clamping range of 2.27" to 2.92". Seven standard sets of leg extensions are provided to extend the pipe I.D. capacity of the standard machine up to 6.77". There are three identical legs in each set.

Table 1: Standard Extension Leg Sets

Part No.	Leg Thickness	Pipe I.D. Range
56-085-01	0.24"	2.75"-3.37"
56-085-02	0.52"	3.31"-3.94"
56-085-03	0.80"	3.87"-4.50"
56-085-04	1.09"	4.44"-5.07"
56-085-05	1.37"	5.01"-5.63"
56-085-06	1.64"	5.55"-6.19"
56-085-07	1.94	6.14"-6.77"

An optional set of extended range legs can be used to extend the pipe I.D. capacity up to 9.04". Note that, to operate on pipe O.D.s over 6", you will need to install the optional 8" diameter head (56-076-00).

Table 2: Extended Range Leg Sets

Part No.	Leg Thickness	Pipe I.D. Range
56-085-08	2.22"	6.71"-7.34"
56-085-09	2.51"	7.28"-7.91"
56-085-10	2.79"	7.85"-8.48"
56-085-11	3.08"	8.42"-9.04"

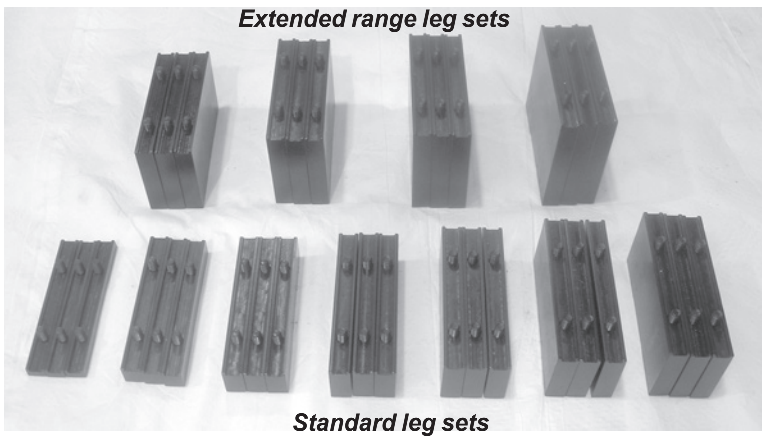


Figure 1-5. The photo shows the standard leg sets (front) and extended range leg sets (back).



Figure 1-6. The pipe I.D. diameter range is stamped on each leg set.

Each leg has two captivated mounting screws that attach the leg to the chuck leg on the mandrel.

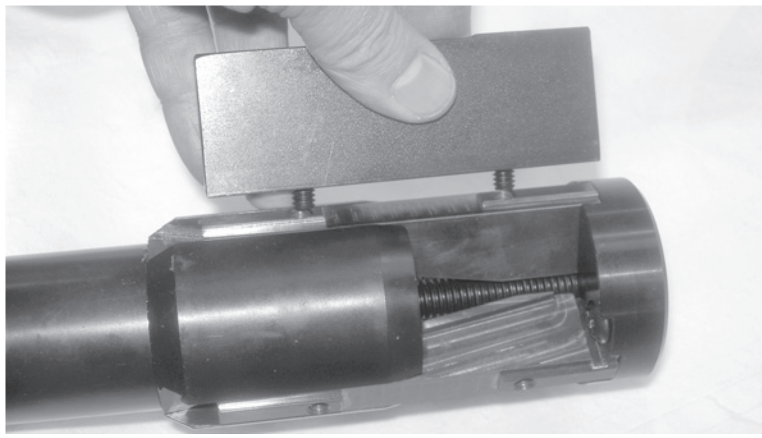


Figure 1-7. The screws in the clamp leg attach it to the chuck leg on the mandrel.

Noise Levels

The following noise levels were measured at 1 m high and 1.6 m from the machine.

Average sound level	62 dBA
Maximum sound level	89 dBA

Specifications

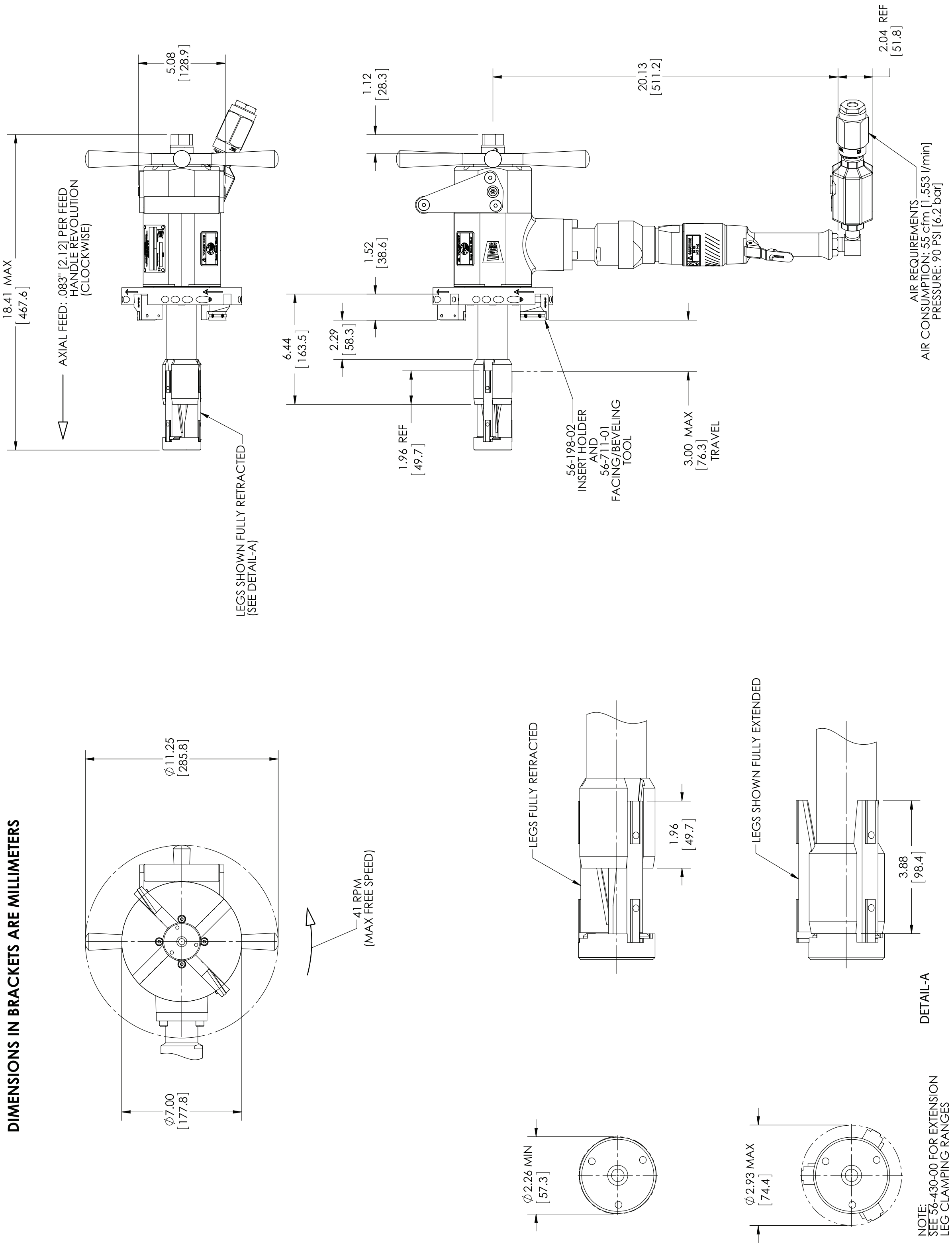
Pipe capacity	2.27" I.D. to 6.77" I.D. (up to 9.04" with extended range kit 56-430-03)
Pipe wall thickness	Up to 0.75"
Controls	—Manual feed with index gauge for measurement —On/off fail-safe motor lever —Motor speed control
Feed rate	0.08" (2 mm) per revolution
Feed stroke	2.5" usable feed travel
Drive options	—Air (70 cfm @ 90 psi) —Hydraulic (8 gpm @ 1500 psi) —Electric (110 V or 220 V)
Tool RPM	0 to 40
Tooling	Standard or high-range tool holder with high-speed steel inserts; carbide available
Tool slots	4 (all rotating head options)
Dimensions	Length: 9" without mandrel; 19" with mandrel Width: 11.5" Height: 27.5" with air motor
Weight	42 lb with mandrel and air motor

Operating Envelopes and Tooling Charts

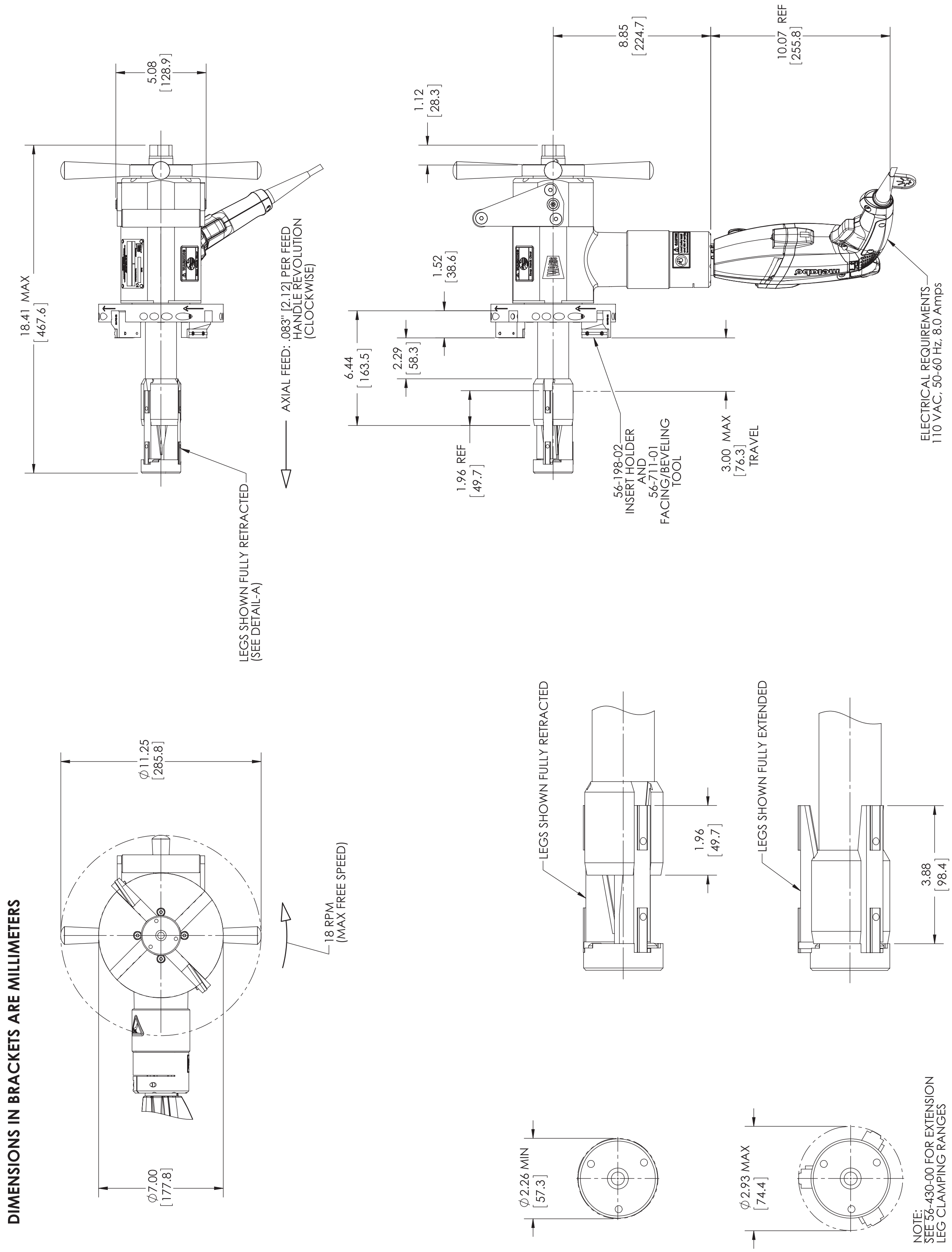
This section includes the following information for using the SBD 206 and FF 313:

- operating envelope for the SDB 206 and FF 313 machine configurations, mandrels, and extension legs
- tooling charts for beveling, counterboring, J-prepping, and deburring.

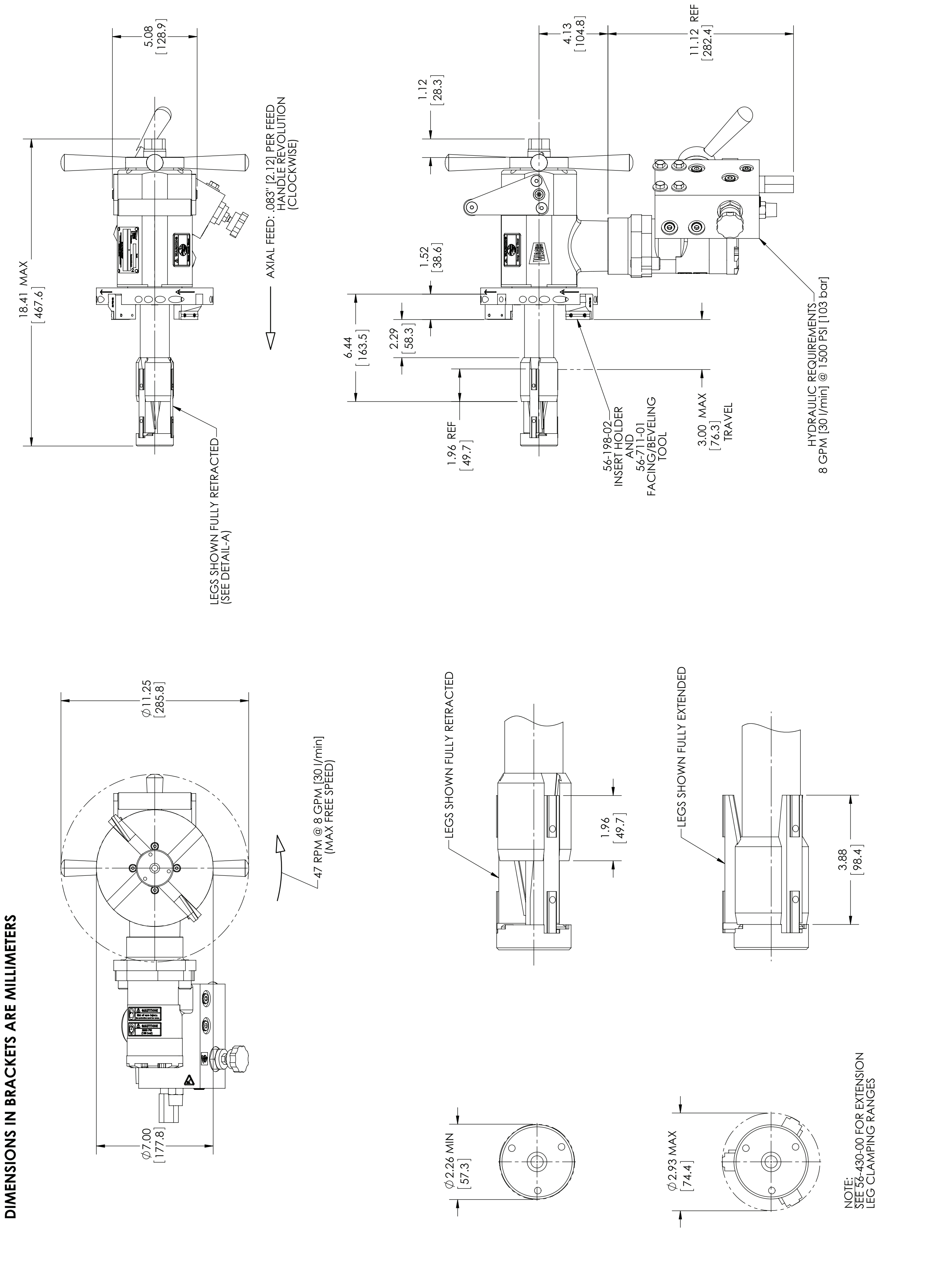
SDB 206, Air Drive (56-000-01)



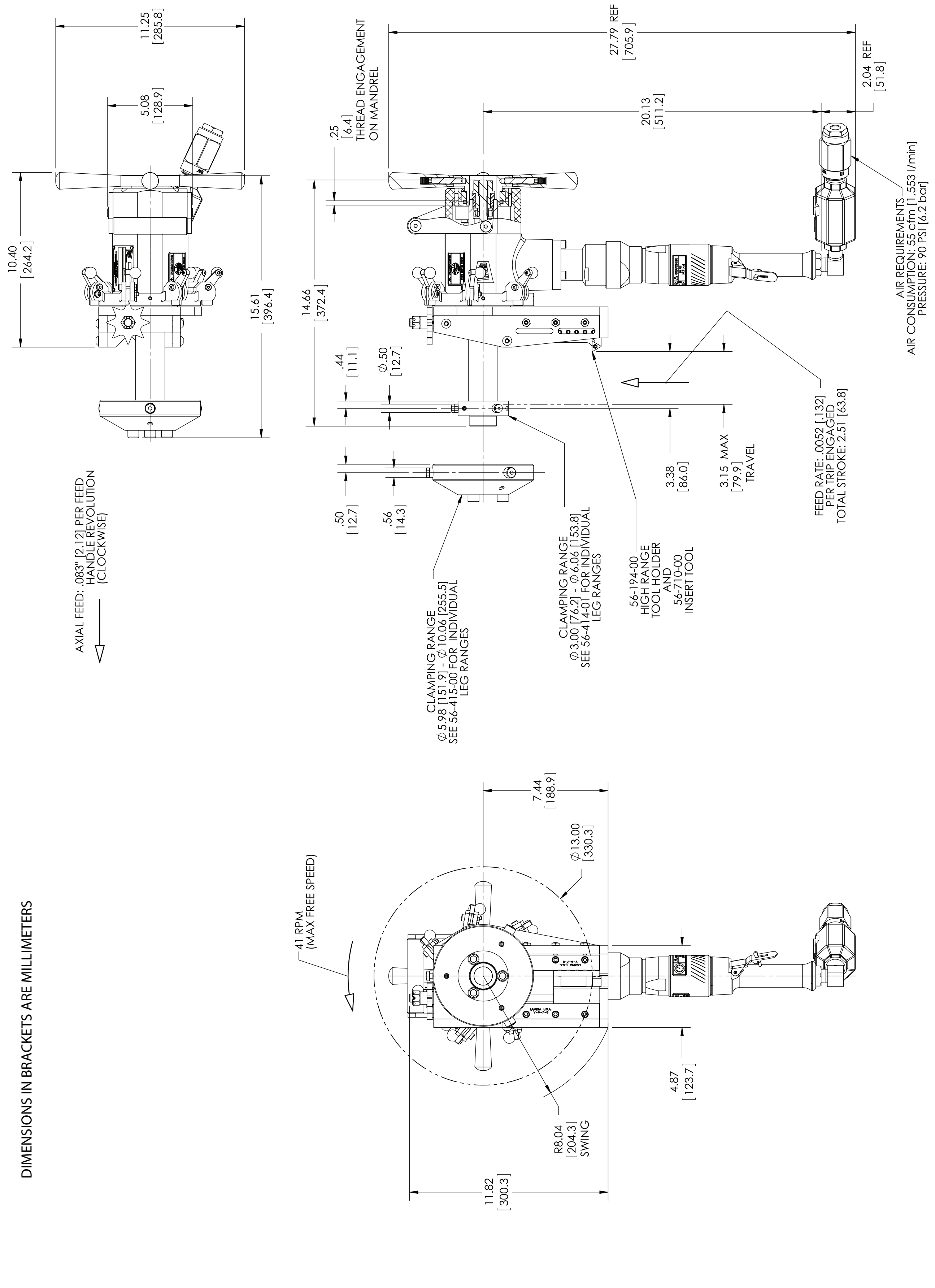
SDB 206, Electric Drive (56-000-02)



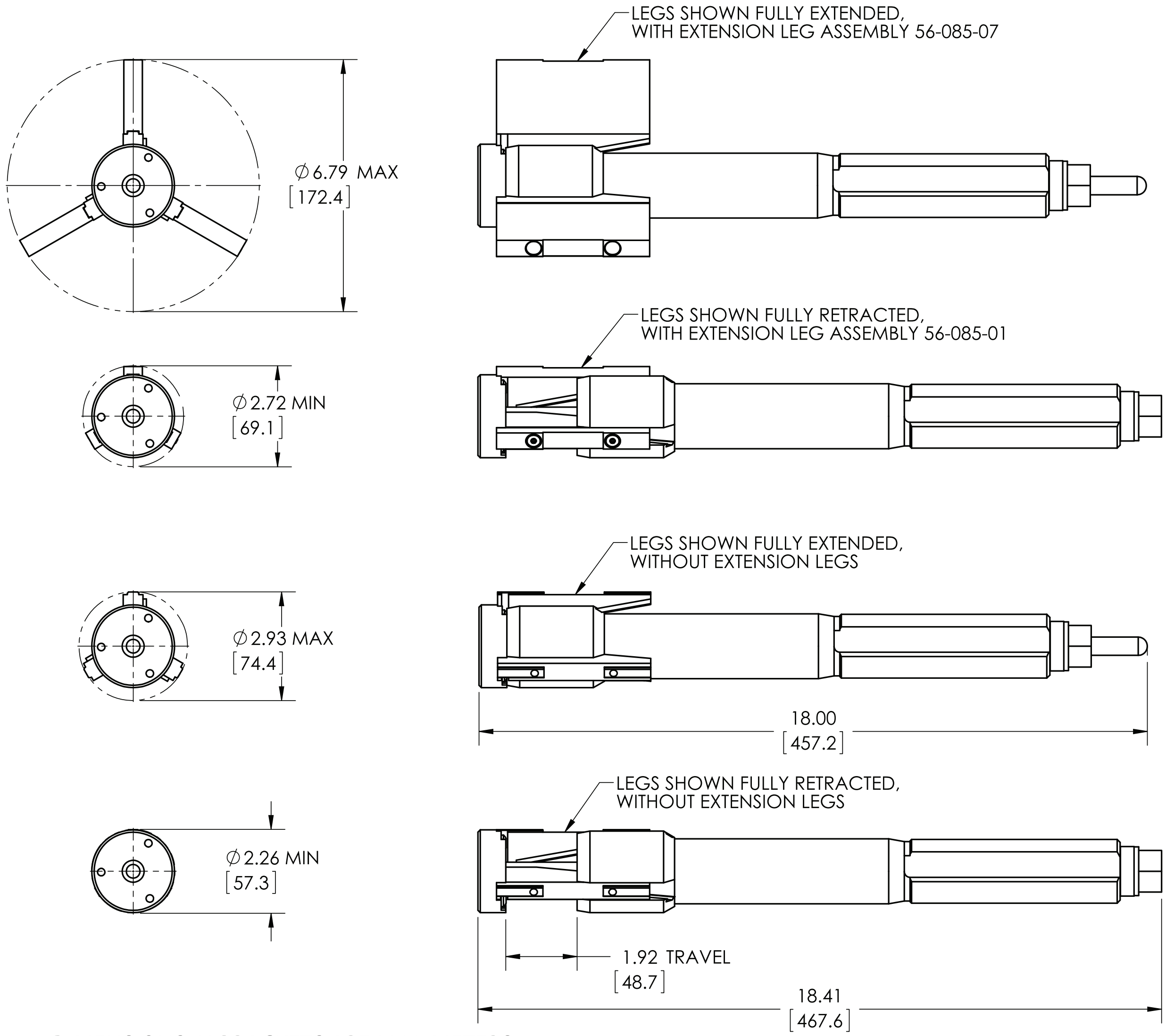
SDB 206, Hydraulic Drive (56-000-03)



FF 313, Air Drive (56-000-FF)



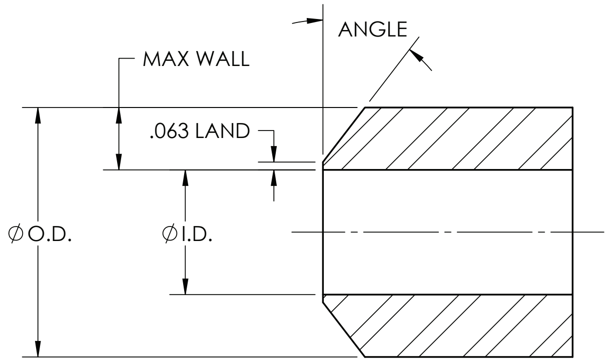
Standard Mandrel and Extension Legs (56-430-00)



DIMENSIONS IN BRACKETS ARE MILLIMETERS

NOTE:
1. FOR LARGER ID'S RANGING FROM: 6.68" - 9.06" [169.7 - 230.2 mm], USE EXTENDED RANGE LEG KIT 56-430-03.

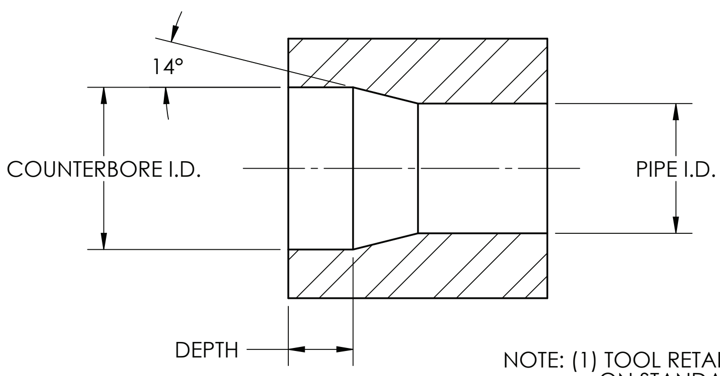
Beveling Tool Chart



NOTE: (1) TOOL RETAINED WITH AT LEAST 2 SCREWS ON STANDARD ROTATING HEAD.

BEVEL TOOL	FACING TOOL	ANGLE	MAX WALL W/ 1/16" LAND	MIN I.D. W/ 1/16" LAND	MAX I.D. (1) W/1/16" LAND	MAX O.D. (1)
56-709-03	56-708-01	37-1/2°	1.38" (35.1mm)	2.26" (57.4mm)	4.88" (124.0mm)	7.60" (193.0mm)
56-709-03	56-708-02	37-1/2°	0.73" (18.5mm)	3.03" (77.0mm)	6.18" (157.0mm)	7.60" (193.0mm)
56-709-02	56-708-01	30°	1.50" (38.1mm)	2.26" (57.4mm)	4.88" (124.0mm)	7.84" (199.1mm)
56-709-02	56-708-02	30°	0.53" (13.5mm)	3.48" (88.4mm)	6.60" (167.6mm)	7.84" (199.1mm)

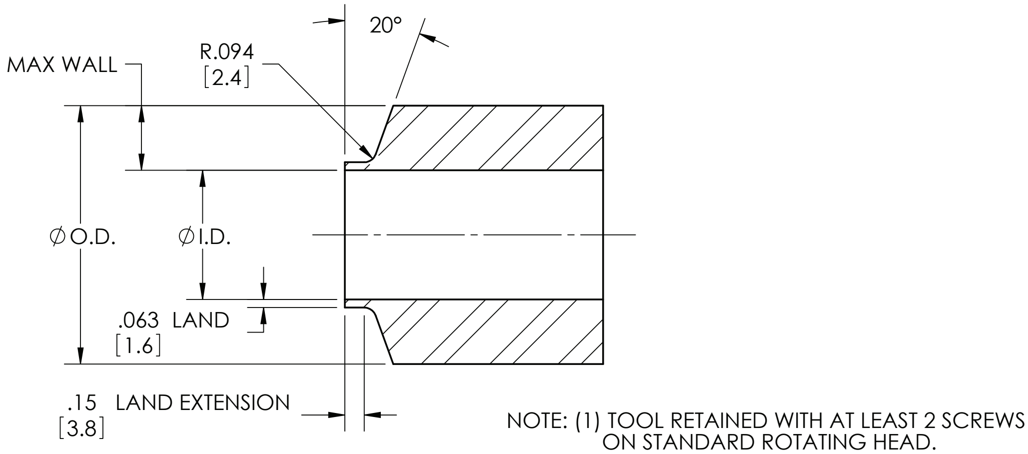
Counterbore Tool Chart



NOTE: (1) TOOL RETAINED WITH AT LEAST 2 SCREWS ON STANDARD ROTATING HEAD

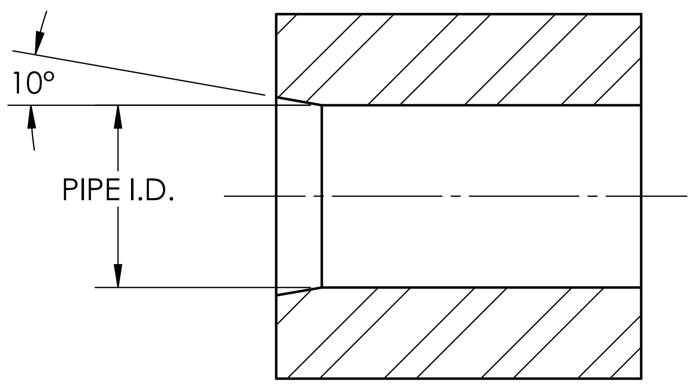
C'BORE TOOL	MIN PIPE I.D.	MIN C'BORE I.D.	MAX C'BORE I.D.(1)	MAX DEPTH	MAX DEPTH W/56-708-01 FACING TOOL
56-705-01	2.38" (60.5mm)	2.62" (66.5mm)	5.88" (149.4mm)	0.63" (16.0mm)	0.48" (12.2mm)
56-705-02	3.50" (88.9mm)	3.75" (95.3mm)	7.00" (177.8mm)	0.63" (16.0mm)	0.48" (12.2mm)
56-705-03	4.50" (114.3mm)	4.75" (120.7mm)	8.00" (203.2mm)	0.63" (16.0mm)	0.48" (12.2mm)

J-Prep Tool Chart



BEVEL TOOL	FACING TOOL	MAX WALL W/ 1/16" LAND	MIN I.D. W/ 1/16" LAND	MAX I.D. (1) W/1/16" LAND	MAX O.D. (1)
56-709-01	56-708-01	1.68" (42.7mm)	2.38" (60.5mm)	5.00" (127.0mm)	8.09" (205.5mm)
56-709-05	56-708-01	1.68" (42.7mm)	2.38" (60.5mm)	6.28" (159.5mm)	9.61" (244.1mm)

Deburring Tool Chart



NOTE: (1) STANDARD ROTATING HEAD

DEBURRING TOOL	MIN PIPE I.D.	MAX PIPE I.D.(1)
56-702-01	2.26" (57.4mm)	5.28" (134.1mm)
56-702-02	2.64" (67.1mm)	5.88" (149.4mm)
56-702-03	3.26" (82.8mm)	6.50" (165.1mm)

Safety

The E.H. Wachs Company takes great pride in designing and manufacturing safe, high-quality products. We make user safety a top priority in the design of all our products.

Read this chapter carefully before operating the SDB 206 or FF 313. It contains important safety instructions and recommendations.

Safe Operating Guidelines

Follow these guidelines for safe operation of all E.H. Wachs equipment.

Look for this symbol throughout the manual. It indicates a personal injury hazard.

- **READ THE OPERATING MANUAL.** Make sure you understand all setup and operating instructions before you begin. Keep this manual with the machine.
- **INSPECT MACHINE AND ACCESSORIES BEFORE USE.** Before starting the machine, look for loose bolts or nuts, leaking lubricant, rusted components, and any other physical conditions that may affect operation. Properly maintaining the machine can greatly decrease the chances for injury.
- **ALWAYS READ STICKERS AND LABELS.** Make sure all labels and stickers are in place, clearly legible, and in good condition. Refer to “Safety Labels” later in this chapter for label locations on the machine. Replace any damaged or missing safety labels; see Chapter 10 for ordering information.
- **KEEP CLEAR OF MOVING PARTS.** Keep hands, arms, and fingers clear of all rotating or moving parts. Always turn the machine off and disconnect the power source before doing any adjustments or service.
- **SECURE LOOSE CLOTHING AND JEWELRY.** Secure or remove loose-fitting clothing and jewelry, and securely bind long hair, to prevent them from getting caught in moving parts of the machine.
- **FOLLOW SAFE PROCEDURES FOR HANDLING LUBRICANTS.** Refer to the manufacturer’s instructions and the Material Safety Data Sheets.

Safe Operating Environment

- Do not use this equipment in a potentially explosive atmosphere. Fire or explosion could result, with the risk of serious injury or death.
- Provide adequate lighting to use the equipment, in accordance with worksite or local regulations.
- **KEEP WORK AREA CLEAR.** Keep all clutter and nonessential materials out of the work area. Only people directly involved with the work being performed should have access to the area.

Operating and Maintenance Safety

- This equipment is to be operated and maintained only by qualified, trained personnel.
- Make sure the equipment is stable when attached to the workpiece for the operation. Ensuring stability of the installed tool is the responsibility of the operator.
- Make sure the workpiece is supported adequately for installation of the equipment. This includes supporting any workpiece "fall-off" section when severing the workpiece. Ensuring support of the workpiece is the responsibility of the operator.
- Tooling on any cutting equipment—including lathe tools, saw blades, milling tools, etc.—may get very hot. Do not touch tooling until you have made sure it is cool enough to handle.
- Wear gloves when removing or cleaning up chips and cutting debris. Chips can be very sharp and cause cuts.
- Before performing any service on the equipment, disconnect the power source. Follow all lock-out/tag-out procedures required at the worksite.

Hydraulic Powered Equipment

- Hydraulic components such as hoses, motors, and manifolds will get hot during operation and may cause burns. Do not touch hydraulic components, except for operator controls, during or after operating the machine.

⚠ WARNING
Injection of hydraulic fluid through the skin is a serious injury that can result in infection, tissue damage, and possible loss of limb. **Seek medical treatment immediately.** First aid is not sufficient treatment for injection injury.

- **Hydraulic injection injury**—A pinhole in a hydraulic hose or fitting can eject fluid with enough force to pierce skin. Check hoses and fittings regularly for leaks. **Do not use bare hands to check for leaks while the system is pressurized.** If you suspect a leak, move a piece of paper or cardboard at least 6 inches (15 cm) over the suspicious area and watch for fluid spraying on the surface.

Pneumatic Powered Equipment

- Air motors may get hot during operation and may cause burns. Do not touch the air motor, except for operator controls, during or after operating the machine.
- Before disconnecting the air line from the equipment, always turn off air at the source and bleed all residual air pressure at the air motor.

Loss or Shut-Off of Power Supply

For all power sources, follow all lock-out/tag-out procedures required at the worksite when disconnecting or servicing the equipment.

- **PNEUMATIC POWERED EQUIPMENT**—Disconnect the air supply from the machine after loss of power to prevent accidental restarting of the machine. Lock out the power supply immediately.
- **HYDRAULIC POWERED EQUIPMENT**—Disconnect hydraulic lines from the hydraulic manifold to prevent accidental restarting of the machine. Lock out the power supply immediately.
- **ELECTRIC POWERED EQUIPMENT**—If the electric drive shuts off because of its built-in thermal protection, disconnect the motor from the power source immediately.

Safety Alerts in This Manual

The following alerts are used throughout this manual to indicate operator safety hazards. In all cases, these alerts include a notice describing the hazard and the means to avoid or reduce risk. Carefully read all safety alerts.

This icon is displayed with any safety alert that indicates a personal injury hazard.

⚠ WARNING
This safety alert indicates a potentially hazardous situation that, if not avoided, **could** result in **death or serious injury**.

⚠ CAUTION
This safety alert, with the personal injury hazard symbol, indicates a potentially hazardous situation that, if not avoided, **could** result in **minor or moderate injury**.

Protective Equipment Requirements

Protective Clothing

Wear safety shoes when operating or servicing the equipment. Serious injury could result from dropping the machine or its components.

Do not wear gloves while operating the machine. Gloves can become entangled in moving parts, resulting in serious injury. Gloves may be worn when setting up the machine or cleaning up after the operation, but take them off when operating the machine.

NOTE

Gloves should be worn when cleaning up chips and other cutting debris. Chips can be very sharp and can cause serious cuts. **Do not wear gloves when the machine is operating.**

Eye Protection

Always wear impact-resistant eye protection while operating or working near this equipment.

For additional information on eye and face protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.133., Eye and Face Protection and American National Standards Institute, ANSI Z87.1, Occupational and Educational Eye and Face Protection.

Hearing Protection

This equipment can produce noise levels above 80 dB. Hearing protection is required when operating the equipment. The operation of other tools and equipment in the area, reflective surfaces, process noises, and resonant structures can increase the noise level in the area.

For additional information on hearing protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.95, Occupational Noise Exposure and ANSI S12.6 Hearing Protectors.

Safety Labels

The following safety labels are provided on the SDB 206/FF 313. If any of these labels is damaged or missing, replace it immediately. See the section on ordering information at the end of this manual.



Figure 2-1. The Keep Hands Clear warning label is on the bearing housing of the SDB 206/ FF 313. (Part no. 66-147-00.)



Figure 2-2. The ear and eye protection label is attached to the air and electric drives of the SDB 206/FF 313. Always wear ear and eye protection when operating the equipment. (Part no. 90-401-03.)



Figure 2-3. The eye protection label is attached to the hydraulic drive of the SDB 206/FF 313. Always wear eye protection when operating the equipment. (Part no. 90-401-01.)

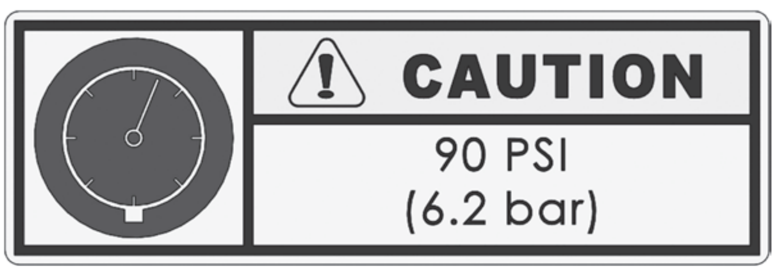


Figure 2-4. The air pressure label is attached to the air drive of pneumatic SDB 206/FF 313 models. Do not operate the equipment with greater than 90 psi (6.2 bar) air pressure. (Part no. 90-401-02.)



Figure 2-5. The hydraulic pressure label is attached to the SDB 206/FF 313 hydraulic drive. Do not operate the equipment with greater than 2000 psi (138 bar) hydraulic pressure. (Part no. 90-402-01.)



Figure 2-6. The hot surface label is attached to the SDB 206/FF 313 hydraulic and electric drive motors. Drive components may become hot enough to cause burns. Make sure they are not hot before touching them. (Part no. 90-403-00 [small]; 90-403-02 [large].)

SDB206/2 Small Diameter Beveler

Setup & Operation

SDB 206 Mandrel Selection

The SDB206 uses two different size heads to cover its machining range. For machining workpieces 2.28" through 4-3/8" I.D., the optional small head is used. The large head is used on pipes over 3-7/8" I.D. These mandrels have three legs which expand equally to contact the inside walls of the workpiece when the draw bolt is tightened.

Measure the pipe I.D. that is to be prepared. Turn to page six (6) to select the proper mandrel leg extension. The leg extensions are stamped with a reference number to indicate size of pipe that they will fit. Once you have determined the mandrel arrangement that is required, attach leg extensions to the blade with the captive screws.

NOTE

A light oil coating on the mandrel will give a longer life and smoother operation.

Mandrel Placement

Inspect the bore of the beveling head for dirt and metal chips. Clean the bore with compressed air or solvent as necessary. Wipe the mandrel clean and apply a light coating of oil. Being careful not to scrape the head bushing, insert the threaded end of the mandrel through the front of the beveling head (Figure 3-1).



Figure 3-1.

When the threads contact the inside of the feed nut, turn it clockwise until the draw bar nut is completely exposed. Be certain to align the key in the end cap to the key way of the mandrel. Use the two locking set screws located on either side of the machine body to apply tension to the machine and mast (Figure 3-2). This will remove any play, and pre-load the machine to the mast.

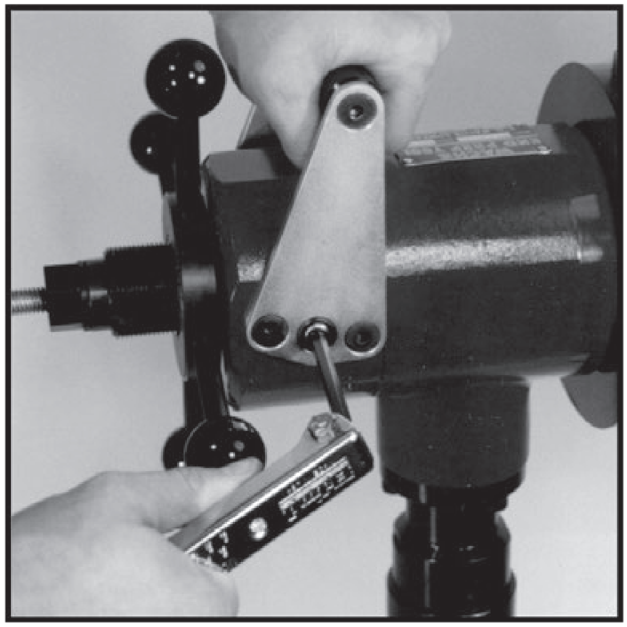


Figure 3-2.

Tooling Set-Up

> ⚠ **CAUTION**
>
> Disconnect the air supply whenever changing or adjusting the form tools.

Install the facing tool in the Rotating head. Refer to Tool Charts for the appropriate tool bit. All tool bits must be installed so the cutting edge will contact the pipe when rotating in a clockwise direction, as seen from rear of machine. The tool bits are locked into place with the set screws adjacent to the slot (Figure 3-3). DO NOT allow tool to come in contact with mandrel or damage may result.



Figure 3-3.

Mounting Machine Into The Pipe

Insert the blade end of mandrel into the pipe. For best results keep the end of the blades as close to the pipe edge as practical. The maximum depth of penetration into the pipe should be 3/4" (19mm) from the tapered ends of the leg to the end of the pipe. Be certain that there is adequate clearance between the blades and the I.D. tooling. This will allow for a normal prep and still keep the beveling head rigid.

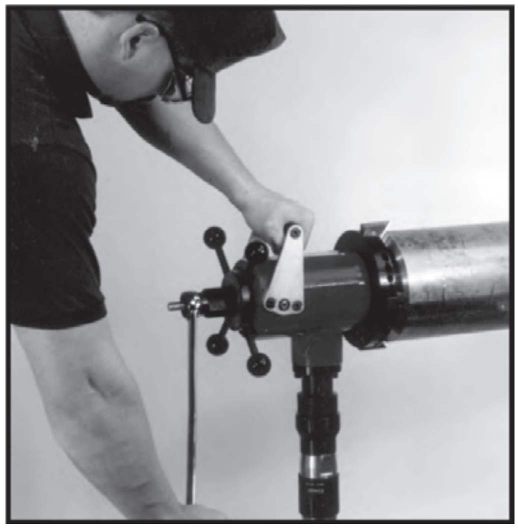


Figure 3-4.

With one hand, hold machine concentric to pipe. At the same time, tighten draw bar nut to 70 ft. lb (Figure 3-4). Move the machine back and forth and up and down while tightening. The chuck legs will automatically center the machine.

Connect a clean, dry, 90 psi (6 bar) air supply to machine.

Start machine and turn feed nut in until cutting tool contacts the pipe. Continue facing until pipe has a clean finish. Retract the beveling head and insert O.D. beveling tool.

Start machine and feed beveling tool into the pipe until facing tool touches again. Adjust O.D. beveling tool in or out radially depending on the land thickness desired.

The last tool bit to install is the I.D. deburring tool. It should be placed in the slot opposite the beveling tool. It may also require adjustment, in or out, to produce the desired height and depth.

NOTE

If only two tools are to be used, place them in opposite slots to offset cutting load.

Continuous Operation

Once the cutting tools are in place, the machine can be moved from one pipe to another of the same size without resetting the tool bits. To do this, loosen the draw bar nut until mandrel is free. Place machine in the next pipe to be prepped and lock the mandrel. Turn on machine and feed in until desired prep is achieved (Figure 3-5).

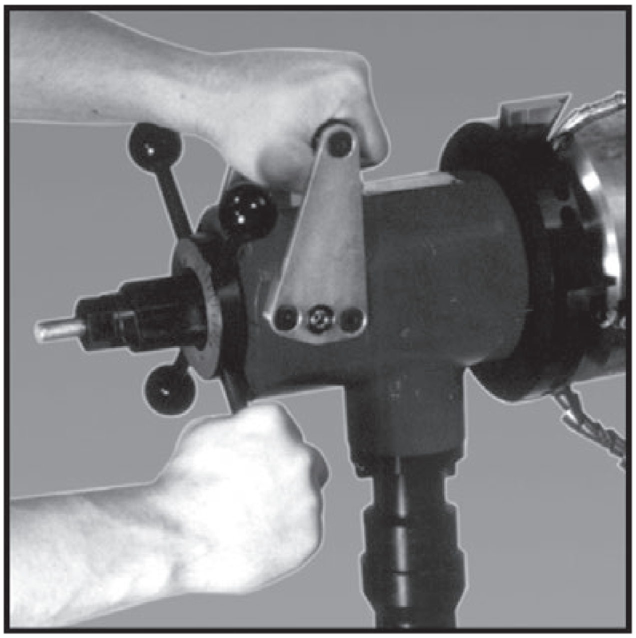


Figure 3-5.

Tips For Good Finish

1. Always place mandrel as close to pipe end as possible.
2. Use a cutting oil or other coolant generously. This will also increase cutter life.
3. Adjust cutting head RPM for material. A good rule of thumb is the harder the material, the slower the speed.
4. Always keep a lot of pressure on the feed nut and pull out of cut quickly when prep is finished.
5. Do not attempt to get a better finish by lightly feeding the tools.
6. Change tool bits or re-sharpen when they become dull.

SDB to Flange Facer Conversion Procedure

1. Remove the mandrel from the machine body.
2. Using the provided hex key set, remove the Rotating Head by loosening and removing the four-5/16-18 x 3/4" stripper bolts (Figure 3-6).

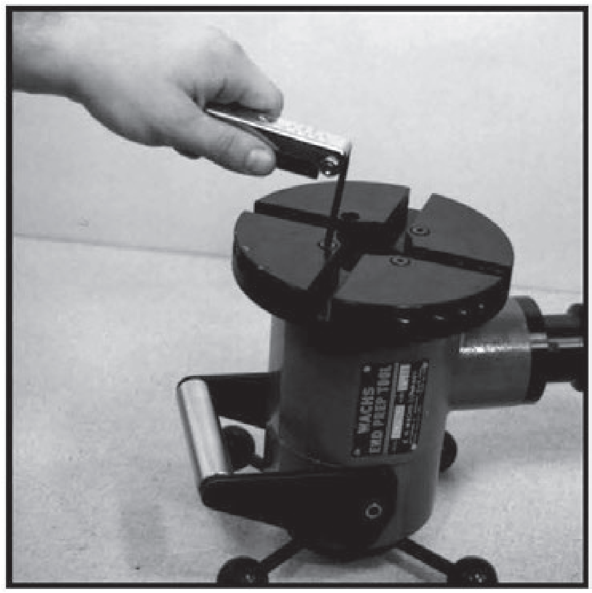


Figure 3-6.

3. Install the Trip Collar assembly by tightening the six locking set screws (Figure 3-7).



Figure 3-7.

4. Mount the Flange Facer tool slide by tightening the four-5/16-18 x 5/8" stripper bolts (Figure 3-8).



Figure 3-8.

5. Install the Flange Facing Mandrel into the flange I.D. using the alignment fixture to insure proper squareness to flange. Once the mandrel has been properly aligned, mount the machine body to the mandrel (Figure 3-9).

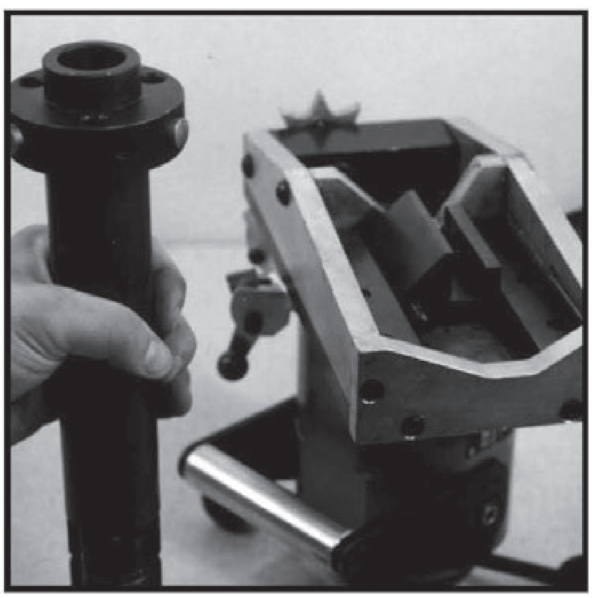


Figure 3-9.

Flange Facing Conversion

Setup & Operation

1. Measure the flange I.D. Refer to mandrel leg extension chart. To select the mandrel adaptor and leg Set required to mount in flange I.D.
2. Insert the solid leg set # 56-135-12 in the mandrel head POINT SIDE DOWN (Figure 3-10)

NOTE

56-135-12 solid leg set is required when installing the 56-144-00 adapter cone onto the mandrel head.

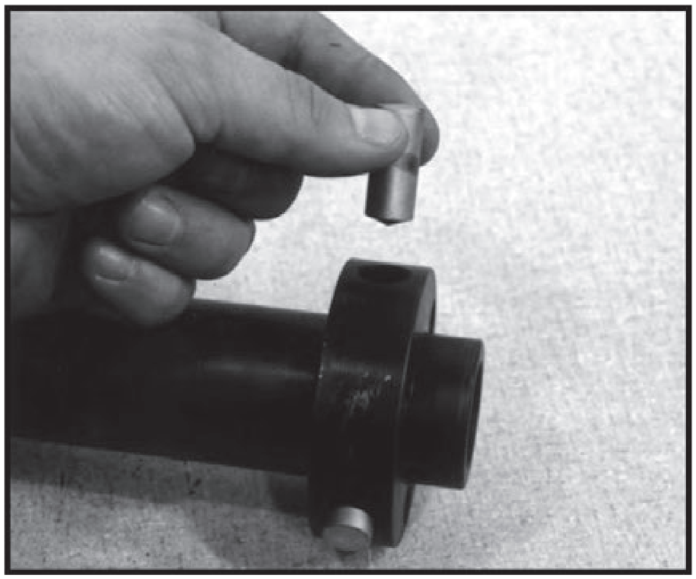


Figure 3-10.

3. Mount the selected adapter over the mandrel head and secure with 3 7/16-20 x 1-1/2 SHCS (Figure 3-11)

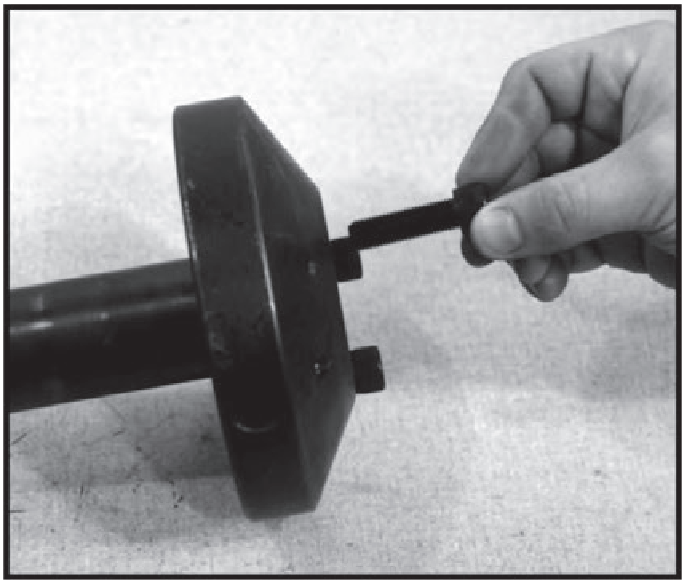


Figure 3-11.

4. Select extension leg set required. Refer to the I.D. range chart decal provided on the leg extension box, or on page in this manual (Figure 3-12).

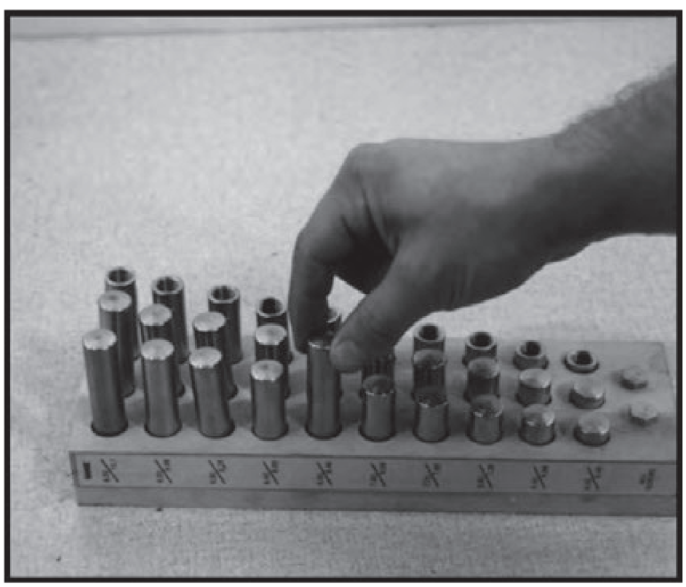


Figure 3-12.

5. Install the adjustment screw into the adjustable leg and tighten completely. (Figure 3-13)

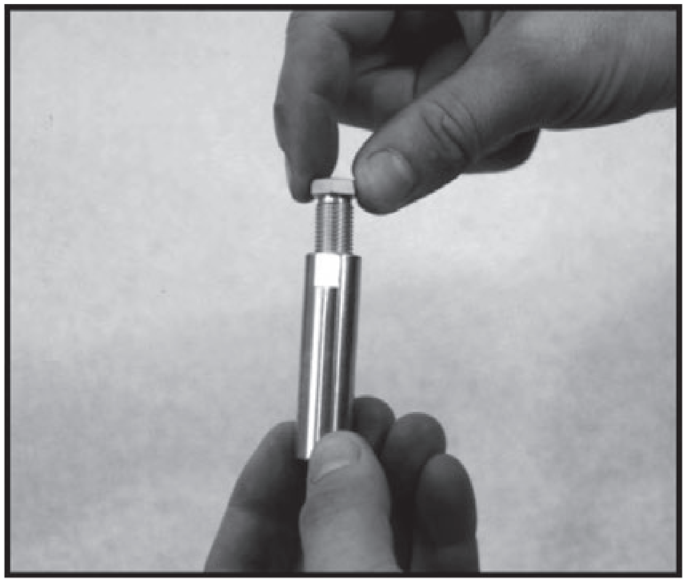


Figure 3-13.

ABOUT THE ADJUSTABLE LEG

An adjustable leg has been provided to compensate for centering on slip over flanges or butt welded flanges when mandrel leg placement must be inside the pipe I.D.

6. Insert the leg set into the adapter. (Figure 3-14)

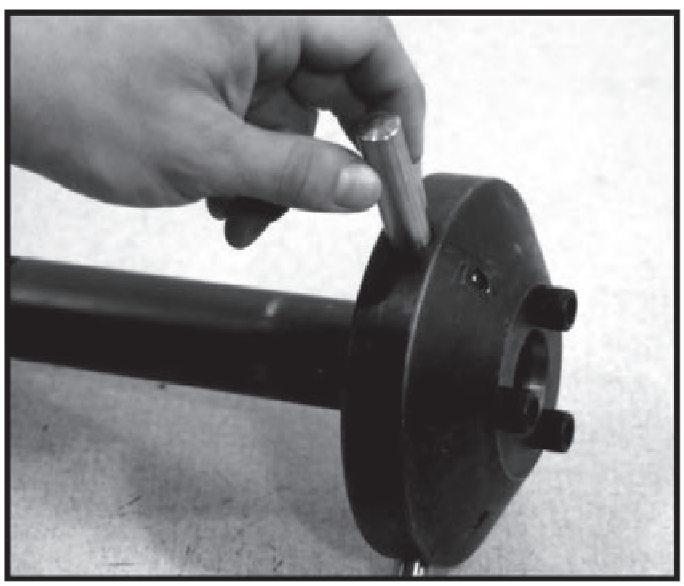


Figure 3-14.

7. Place the mandrel assembly into the flange I.D. with one leg at the 6 o'clock position. The legs should be kept as close as possible to the flange I.D. edge, yet back far enough to perform the desired operation. Snug the mandrel into place by tightening the draw bar nut with the supplied 1-1/8" wrench (Figure 3-15).

NOTE

Observe the mandrel keyway slots. When the slots are at the nine o'clock and three o'clock position the flange facer motor position can be placed at the six o'clock or twelve o'clock location. Position the mandrel slots at the desired location for air motor clearance or operation.

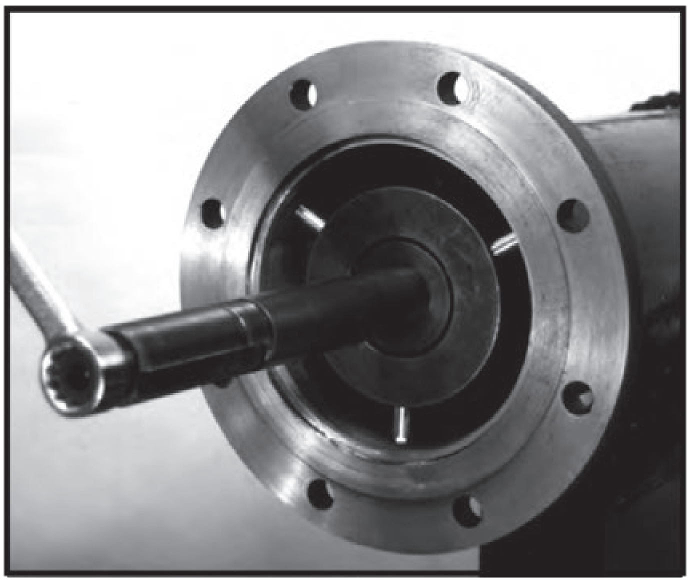


Figure 3-15.

8. Slide the flange alignment fixture over the mandrel shaft. (Figure 3-16).

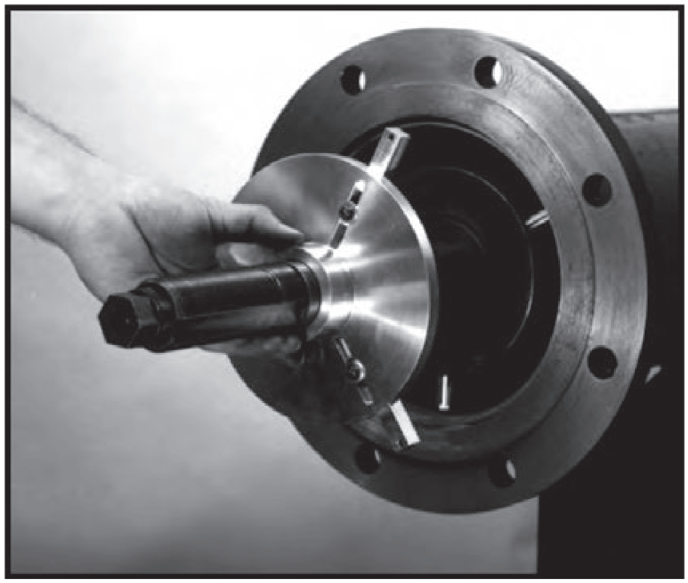


Figure 3-16.

9. Extend the alignment arms, if necessary, with the supplied hex key set. (Figure 3-17).

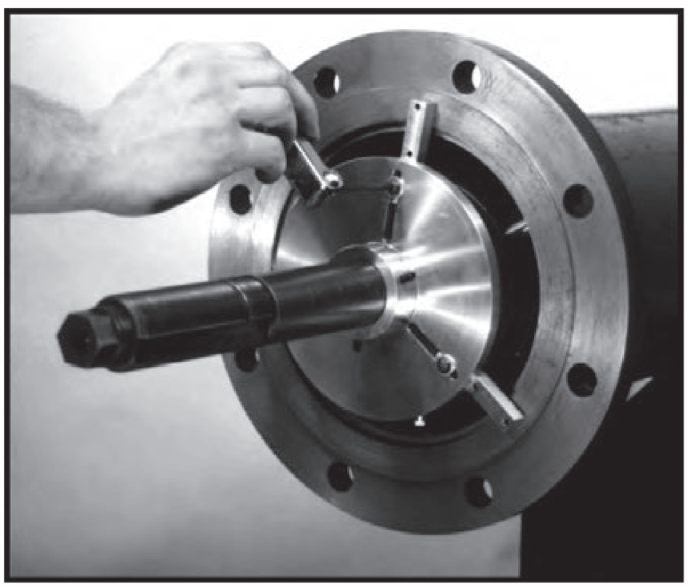


Figure 3-17.

10. Loosen the mandrel assembly using the draw bar nut and push the alignment fixture firmly against the flange face. Retighten the draw bar nut with the supplied 1-1/8" wrench. (Figure 18) Remove alignment fixture.

NOTE

The alignment fixture automatically squares the mandrel to the flange surface, and assures precise square cut.

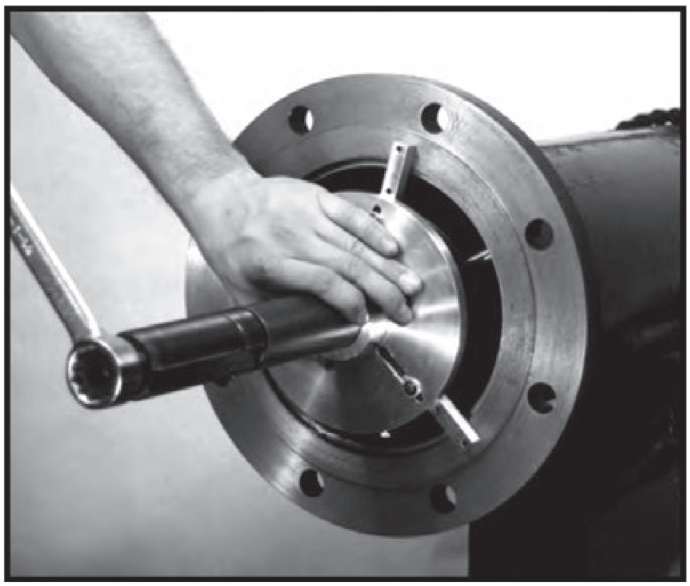


Figure 3-18.

11. Install the flange facing machine on the mandrel shaft. Be sure to wipe the mandrel clean.

NOTE

Align the internal machine keys with the mandrel keyway slots.

Engage the internal machine keys on the mandrel keyway slots. Push the machine forward. Rotate the handle assembly clockwise, engaging the machine feed nut into the threaded portion of the mandrel shaft. (Figure 3-19)

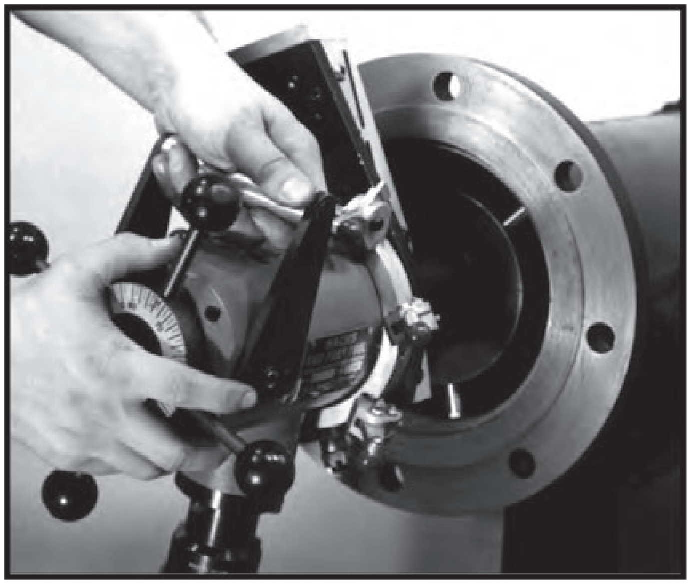


Figure 3-19.

12. Install the tooling in to the flange facer tool slide slot. (Figure 3-20). Refer to the tool holder/ tool bit diagram.

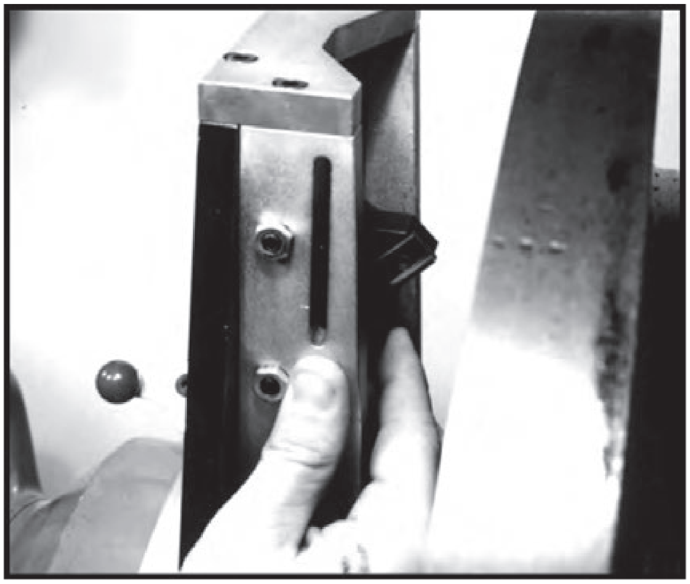


Figure 3-20.

13. Tighten the tool bit locking set screws with the supplied hex key set. (Figure 3-21)

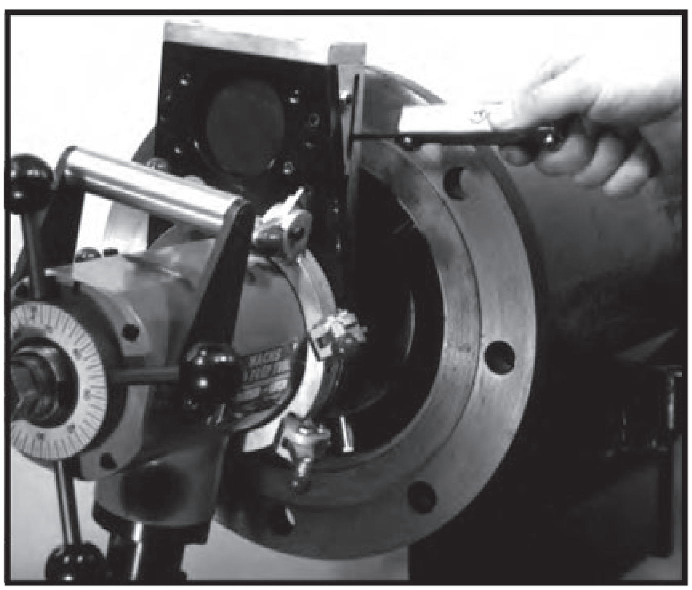


Figure 3-21.

14. Attach the air supply. Press the air motor lever and rotate the machine slowly, to verify clearance. (Figure 3-23)

IMPORTANT

E.H. Wachs Co. recommends the use of an ATM air treatment module (pn 26-407-00) to filter air and lubricate the air motor. The air motor warranty will be void if an ATM is not used.

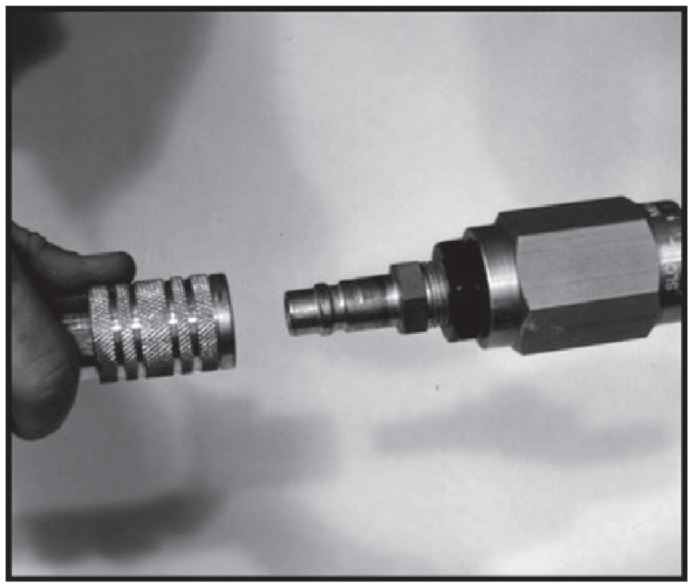


Figure 3-22.

15. Set the throttle control valve. The FF 313 is equipped with a throttle control valve to meter the air flow to the motor. Rotating the throttle clockwise will open the valve, counter clockwise rotation will close the valve. (Figure 3-23)

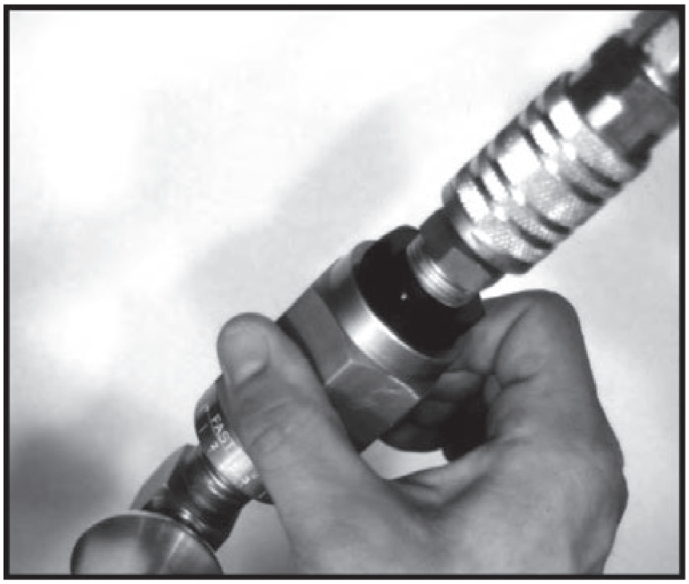


Figure 3-23.

16. Rotate the starwheel nut with the supplied 3/4" socket and ratchet, (Figure 3-24) until the tool bit tip is flush with the desired surface to be faced. (Figure 3-25).

NOTE

Adjust the cutting head RPM with the throttle control for flange size being machined. 3 to 4 RPM recommended for 10" to 13" flange O.D. Increase RPM as flange sizes become smaller.

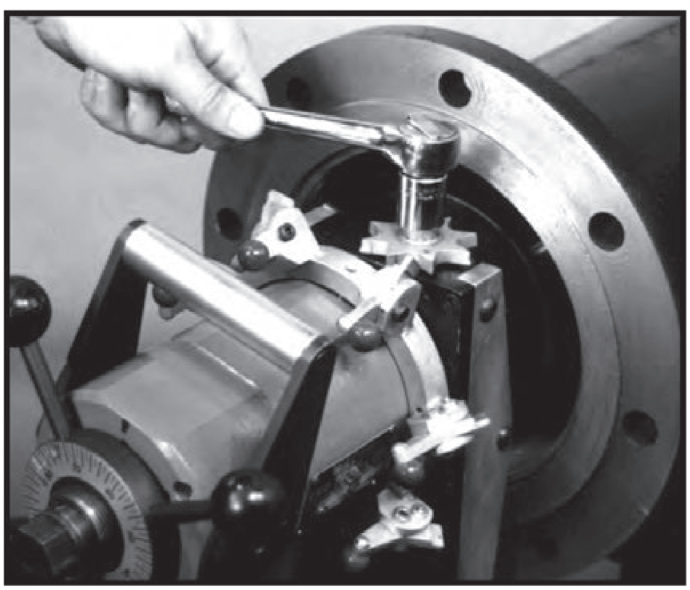


Figure 3-24.

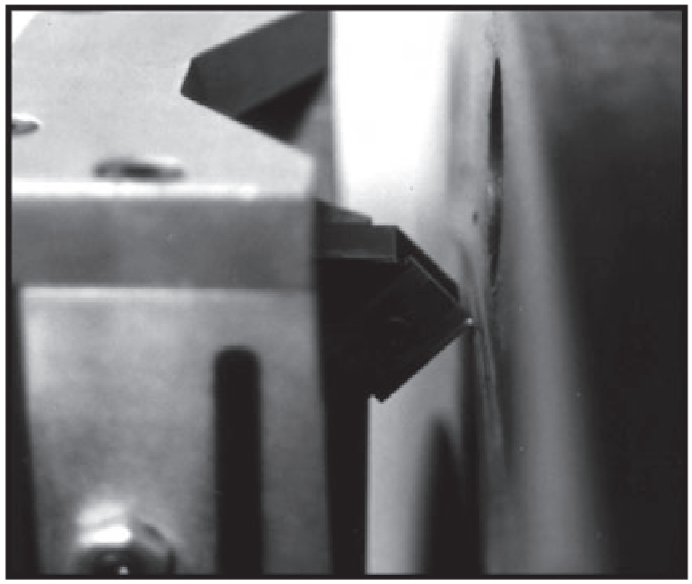


Figure 3-25.

17. Rotate the axial feed handle assembly clockwise until the tool bit just touches the desired surface to be faced.
18. Again rotate the tool slide starwheel nut, raising the bit just above the surface to be faced.
19. Using the infeed indice gauge, rotate the axial feed handles clockwise until the desired depth of cut is attained. (Figure 3-26)

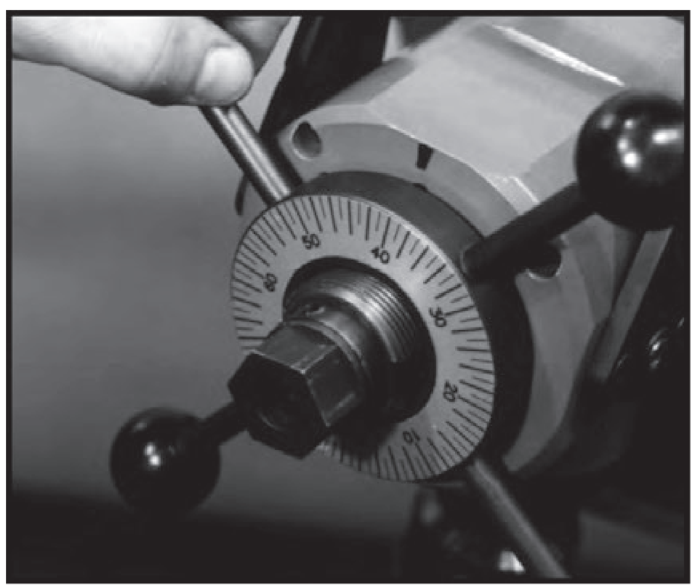


Figure 3-26.

20. Tighten the machine /mandrel locking set screws with the provided hex key set. (Figure 3-27)

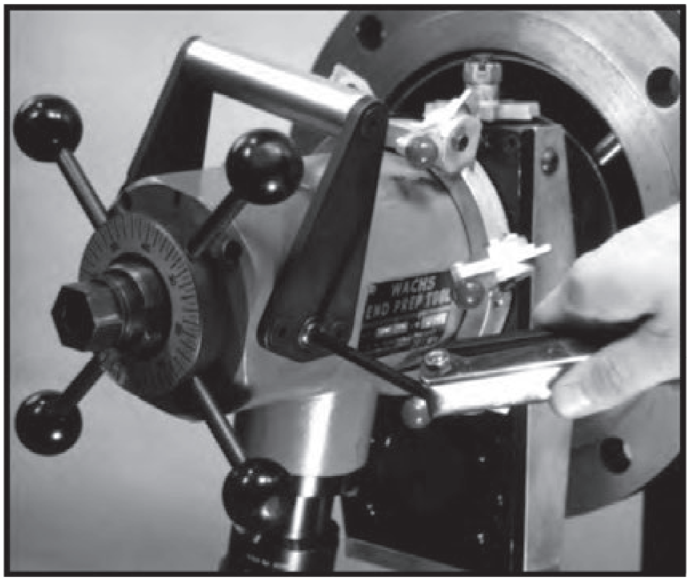


Figure 3-27.

21. Engage the desired number of trips on the trip collar*. assembly to achieve the surface finish required. (Figure 3-28) (Refer to flange surface trip chart.)

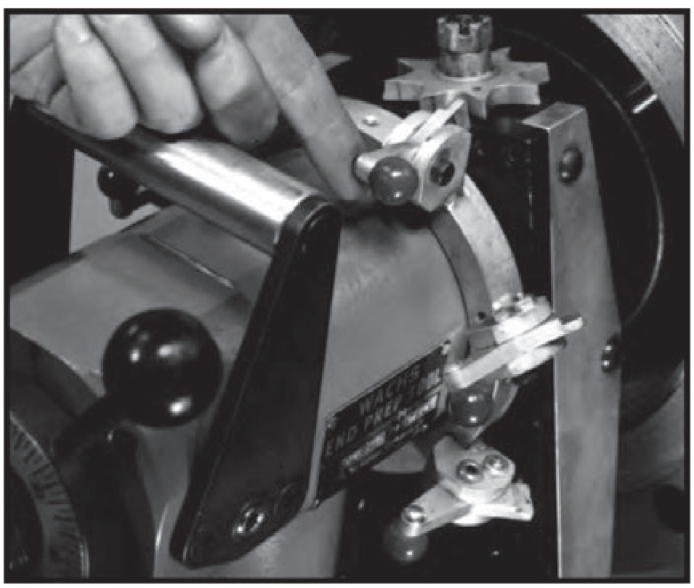


Figure 3-28.

NOTE

Take light cuts to clean up the flange face. To produce a 500 RMS or record groove finish, best results are achieved with a finish cut depth of .007" to .008"

22. * **Time the starwheel**. In order to prevent damage to machine, the star wheel must be timed prior to engaging any trips. (Figure 29)

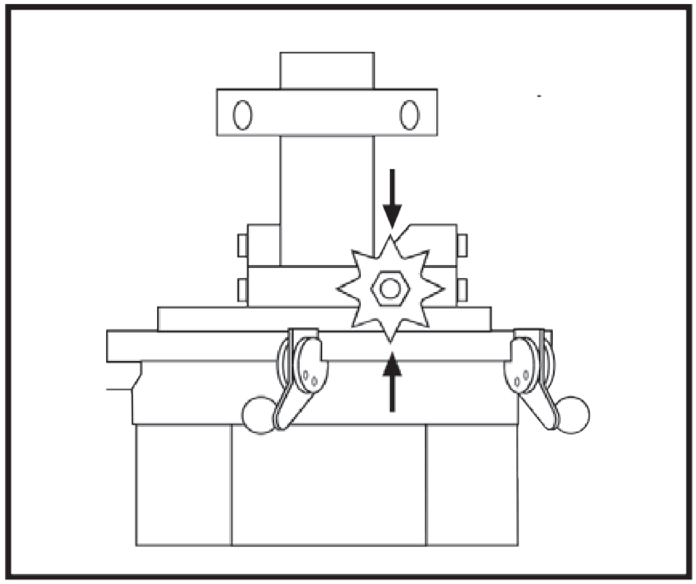


Figure 3-29.

23. The machine is now ready to cut. Press the air motor lever to begin cutting.

Tips For a Good Finish

Single Point Flange Facing/Beveling Module

1. Always place mandrel as close to pipe end as possible.

2. Use cutting coolant generously. This will also increase cutter life.

3. CHATTER: Tool chatter occurs when the tool begins to vibrate during cut. Excessive tool chatter can cause poor quality surface finishes. Chatter can be caused by any one of a number of variables inherent in a portable machine of this type.

4. INTERMITTENT CUTS: When working on a rough cut end of a piece of pipe or a warped flange, tou will need to do an intermittened cut. In order to prolong tool life and reduce shock loads on the machine and inserts, intermittent cuts should be performed at a slower feed rate. Once a full cut is achieved, operating speeds can be increased to normal.

5. As you finish a pass, note your location on the indiced axial feed gauge. Take your next pass; rotate the feed handle backwards one full turn to your noted location and retract your tool slide. Once retracted, rotate the feed handle in the amount you wish for the cut depth of your next pass. This will allow you to retract the slide without damaging the tooling, remove all backlash in the feed handle and give you an exact depth of cut on your next pass.

6. To produce a 500 RMS or record groove finish, the best results are achieved with a finish cut depth of .007" to .008".

Manual Bevel Generation

Using Single Point Module

A bevel can be generated with the Flange Facing Module by feeding the cutting tool into the work radially and axially simultaneously. As the radial feed advances the tool automatically, the operator must withdraw the tool by rotating the axial feed handle counterclockwise. The correct amount of axial feed per machine revolution is given on the following chart.

TRIP ENGAGEMENT	RMS FINISH
1 TRIP	63 RMS
2 TRIP	125 RMS
4 TRIP	250 RMS
6 TRIP	500 RMS

For example, to generate a 30 degree bevel with 6 trips engaged (the fastest tool setting), the operator must withdraw the cutting tool .018" (18 thousanths) increments on the calibrated feed dial located on the Feed Handle Assembly.

MANUAL BEVEL GENERATION CHART

Trips	Axial feed rate required per machine revolution			
Engaged	10º Bevel	20º Bevel	30º Bevel	37.5º Bevel
6	.006"	.011"	.018"	.024"
4	.004"	.008"	.012"	.016"
2	.002"	.004"	.006"	.008"
1	.001"	.002"	.003"	.004"

Maintenance

Under normal operating conditions, the bevel gear sets and roller bearing should be inspected every 100 hours of operation and lubricated as needed. If exceptionally difficult work has been performed or if excessive coolant has contaminated the gear sets and roller bearings, inspection should be done much more frequently.

The bore of the cutting head, feed nut and mandrel must be kept cleaned and oiled.

Main Shaft Bearing Pre-Load

Lock Nut Tool Required

After the first ten hours of operation, the mainshaft bearing preload should be checked. Remove the air motor. Remove the 4 1/4-20 x 2 1/2 SHCS to remove feed nut housing (56-002-00). Bend the lock washer (56-034-00) tab clear from the locknut (56-033-00). Insert and tighten an old, used tool bit into one of the slots on the cutting head. Clamp machine into a bench vise. Using the lock nut tool and a torque wrench, tighten locknut to 50 ft. lbs. while rotating the main housing. Once tight, secure lock washer tang into the closest locknut slot. Replace feed nut housing and fasteners, replace and secure air motor.

After every ten hours of operations, inspect the mandrel guide bushing for wear. Replace as necessary.

NOTE

Excessive chatter may indicate a worn mandrel guide Bushing.

After 40 hours of operation, flush the air motor with a solution of three parts cleaning solvent and one part air motor oil. After flushing, add 1 oz. (30 cc) air motor oil into air line and run air motor for one minute. It is very important that the components of the mandrel assembly remain clean and free from corrosion. The legs and machine surfaces should be cleaned and oiled on a daily basis.

Mandrel Stress Inspection Procedure

1. The mandrel should be removed from the machine body and inspected after every twenty hours of operation.

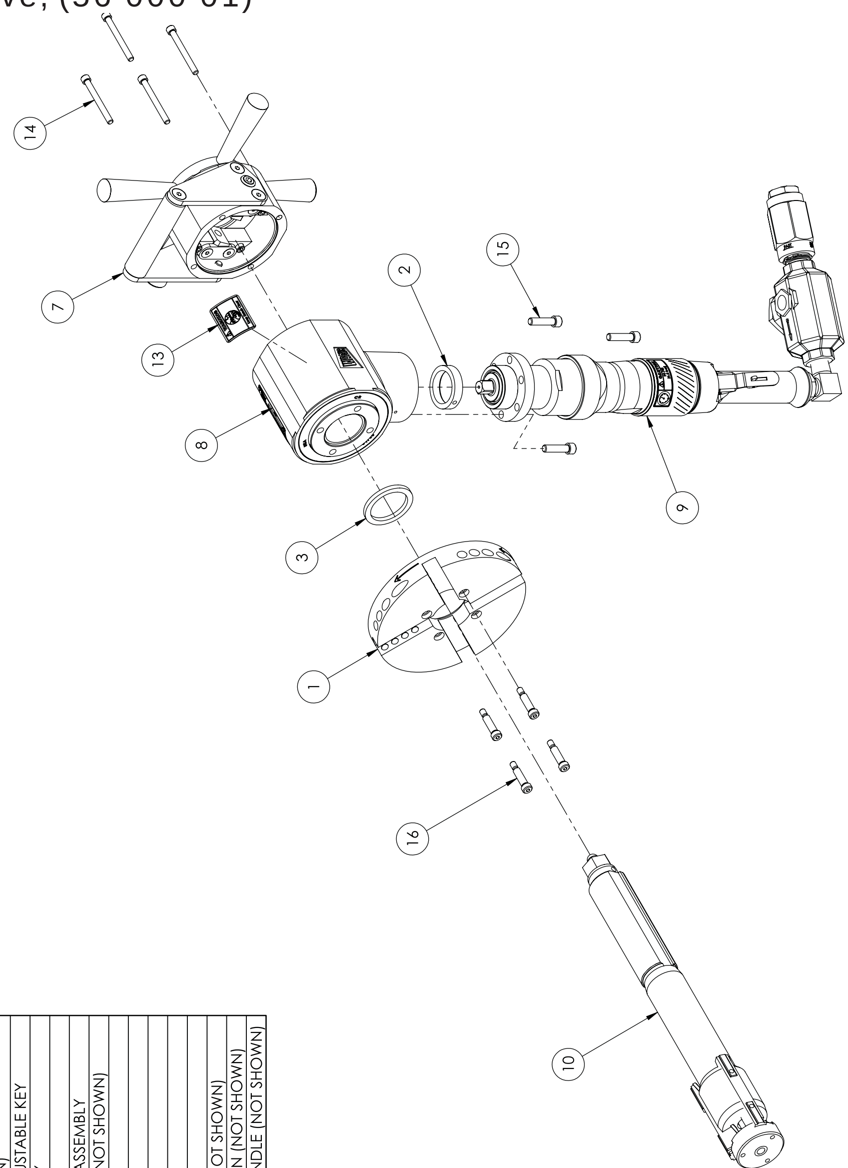
2. Remove the drawbar nut (# 56-025-00) and the collar nut (# 56-024-00).

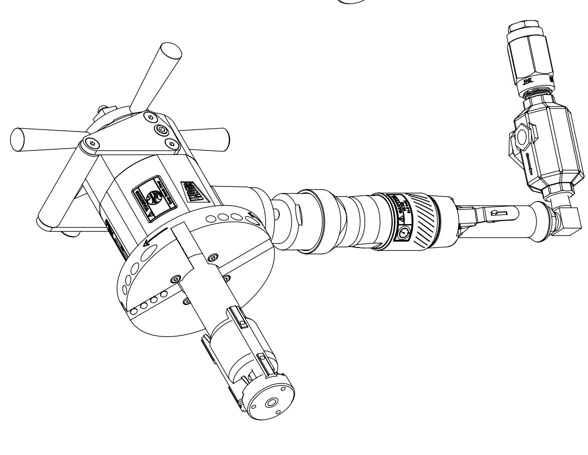
3. Remove the mandrel from the machine body by rotating the feed handles counter clockwise.

4. Physically examine the mandrel and threads; look for any signs of wear or damage. Replace the mandrel if worn.

PARTS LISTS AND DRAWINGS

SDB 206, Air Drive, (56-000-01)

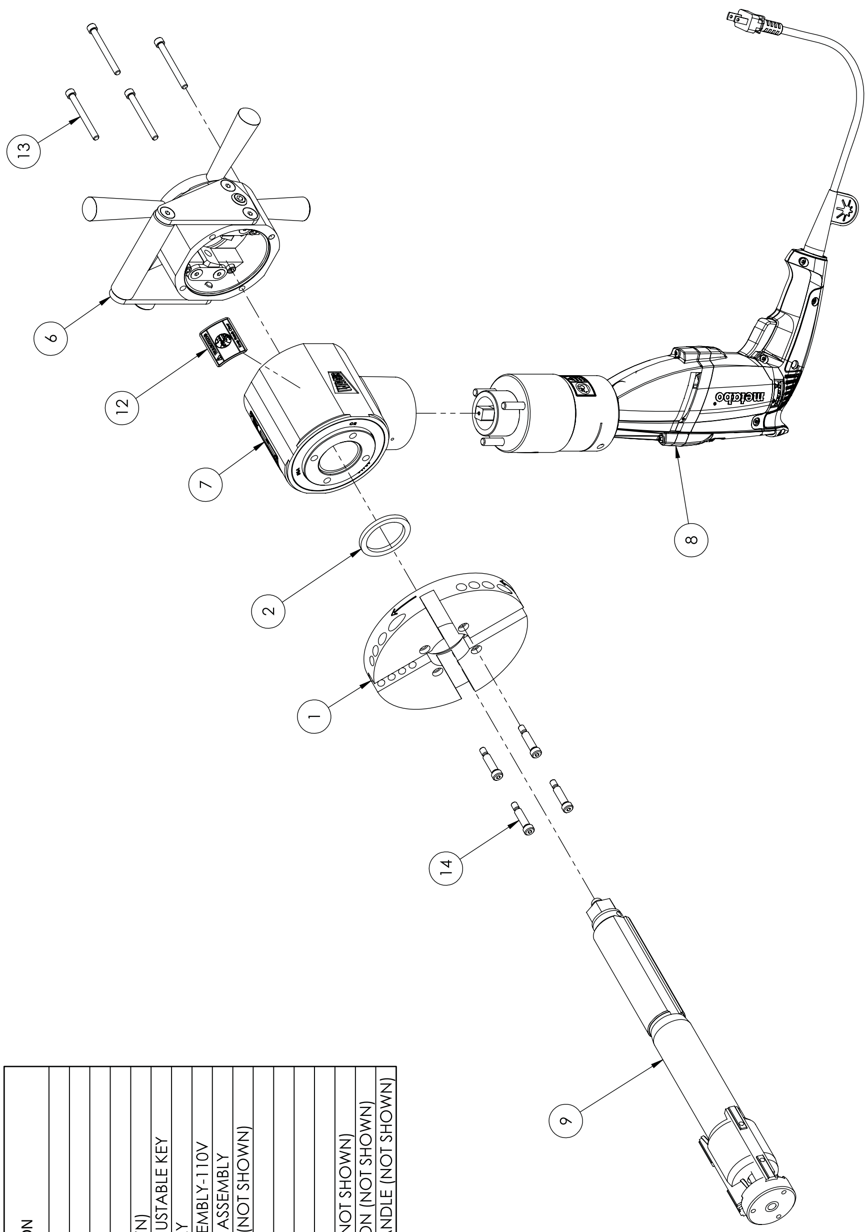


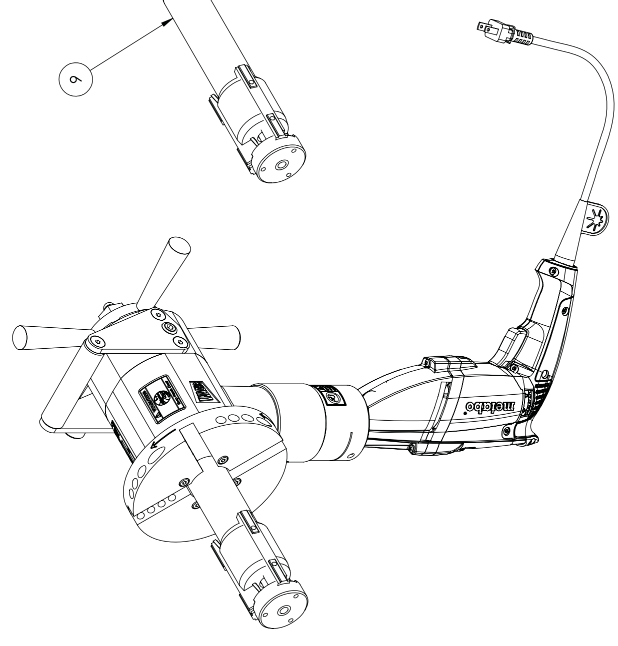


NOTES:
1. SHIPPED LOOSE WITH MACHINE:
(2) 56-043-00 WIPER, FELT
2. SHIPPING DIMENSIONS: 33.36" [847.3mm] LENGTH X 28.44" [722.4mm] WIDTH X 18.23" [463.0mm] HEIGHT

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-005-00	1	HEAD, ROTATING
2	56-010-00	1	RING, SPACER
3	56-043-00	3	WIPER, FELT
4	56-099-00	1	LABEL (NOT SHOWN)
5	56-214-00	1	INSERT, FOAM (NOT SHOWN)
6	56-215-00	1	CASE, STORAGE (NOT SHOWN)
7	56-300-01	1	REAR CAP ASSEMBLY W/ADJUSTABLE KEY
8	56-301-01	1	BEARING HOUSING ASSEMBLY
9	56-302-00	1	AIR MOTOR ASSEMBLY
10	56-430-00	1	SDB 206 MANDREL AND LEG ASSEMBLY
11	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
12	56-MAN-01	1	MANUAL (NOT SHOWN)
13	66-147-00	1	LABEL, WARNING
14	90-050-25	4	SHCS 1/4-20 X 2.5
15	90-060-12	3	SHCS, 5/16-18 X 1-1/4
16	90-067-59	4	BOLT, STRIPPER 5/16 X 1
17	90-800-06	1	WRENCH, 5/64-1/4 HEX SET (NOT SHOWN)
18	90-800-29	1	WRENCH, 1-1/8 COMBINATION (NOT SHOWN)
19	90-800-62	1	WRENCH, 3/16 HEX 9" TEE HANDLE (NOT SHOWN)

SDB 206, 110 V Electric (56-000-02)





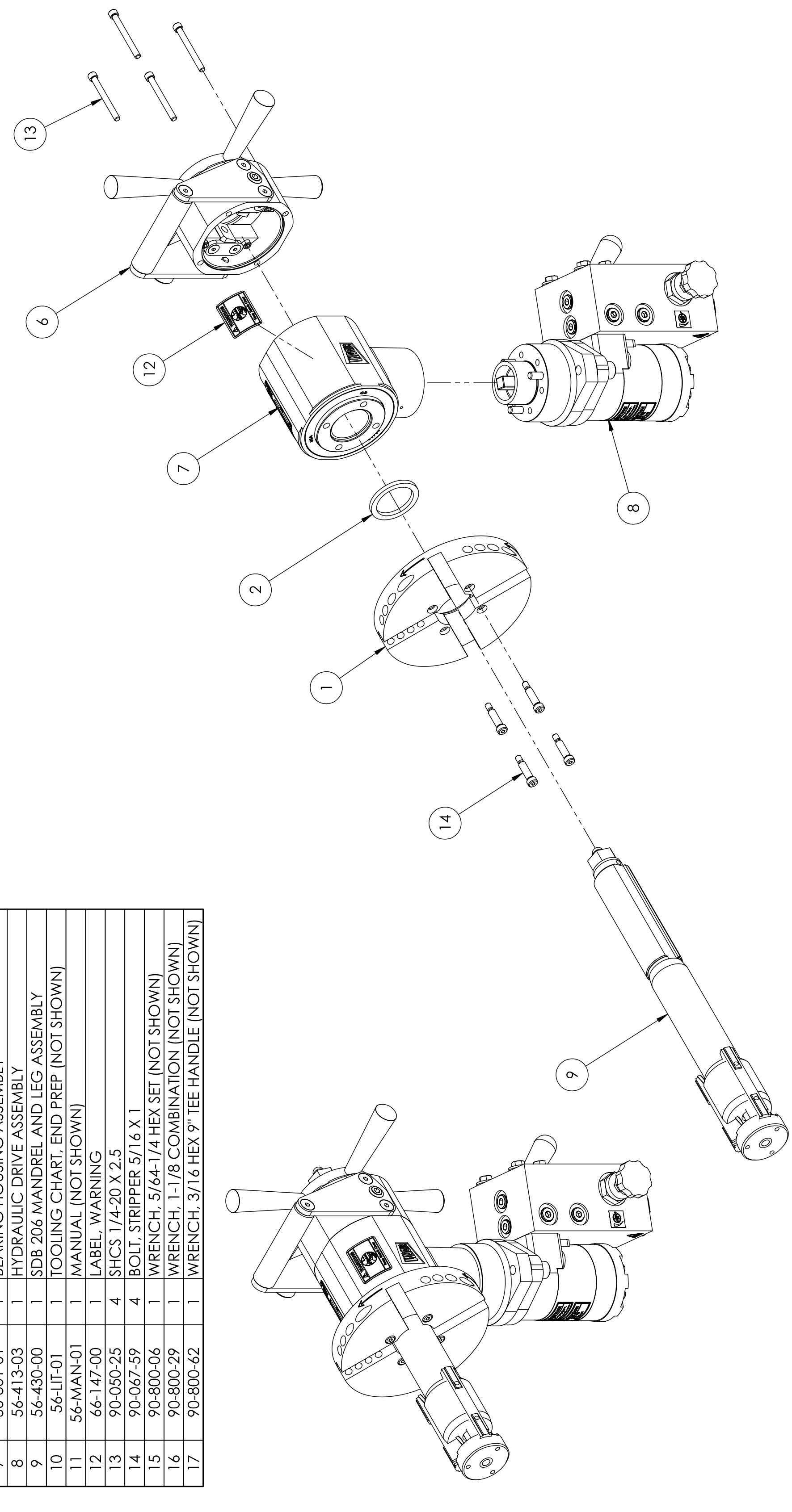
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-005-00	1	HEAD, ROTATING
2	56-043-00	3	WIPER, FELT
3	56-099-00	1	LABEL (NOT SHOWN)
4	56-214-00	1	INSERT, FOAM (NOT SHOWN)
5	56-215-00	1	CASE, STORAGE (NOT SHOWN)
6	56-300-01	1	REAR CAP ASSEMBLY W/ADJUSTABLE KEY
7	56-301-01	1	BEARING HOUSING ASSEMBLY
8	56-413-01	1	SDB 206/2 ELECT. DRIVE ASSEMBLY-110V
9	56-430-00	1	SDB 206 MANDREL AND LEG ASSEMBLY
10	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
11	56-MAN-01	1	MANUAL (NOT SHOWN)
12	66-147-00	1	LABEL, WARNING
13	90-050-25	4	SHCS 1/4-20 X 2.5
14	90-067-59	4	BOLT, STRIPPER 5/16 X 1
15	90-800-06	1	WRENCH, 5/64-1/4 HEX SET (NOT SHOWN)
16	90-800-29	1	WRENCH, 1-1/8 COMBINATION (NOT SHOWN)
17	90-800-62	1	WRENCH, 3/16 HEX 9" TEE HANDLE (NOT SHOWN)

NOTES:
1. SHIPPED LOOSE WITH MACHINE:
   (2) 56-043-00 WIPER, FELT
2. SHIPPING DIMENSIONS: 33.36" [847.3mm] LENGTH X 28.44" [722.4mm] WIDTH X 18.23" [463.0mm] HEIGHT

SDB 206, Hydraulic Drive (56-000-03)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-005-00	1	HEAD, ROTATING
2	56-043-00	3	WIPER, FELT
3	56-099-00	1	LABEL (NOT SHOWN)
4	56-214-00	1	INSERT, FOAM (NOT SHOWN)
5	56-215-00	1	CASE, STORAGE (NOT SHOWN)
6	56-300-01	1	REAR CAP ASSEMBLY W/ADJUSTABLE KEY
7	56-301-01	1	BEARING HOUSING ASSEMBLY
8	56-413-03	1	HYDRAULIC DRIVE ASSEMBLY
9	56-430-00	1	SDB 206 MANDREL AND LEG ASSEMBLY
10	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
11	56-MAN-01	1	MANUAL (NOT SHOWN)
12	66-147-00	1	LABEL, WARNING
13	90-050-25	4	SHCS 1/4-20 X 2.5
14	90-067-59	4	BOLT, STRIPPER 5/16 X 1
15	90-800-06	1	WRENCH, 5/64-1/4 HEX SET (NOT SHOWN)
16	90-800-29	1	WRENCH, 1-1/8 COMBINATION (NOT SHOWN)
17	90-800-62	1	WRENCH, 3/16 HEX 9" TEE HANDLE (NOT SHOWN)

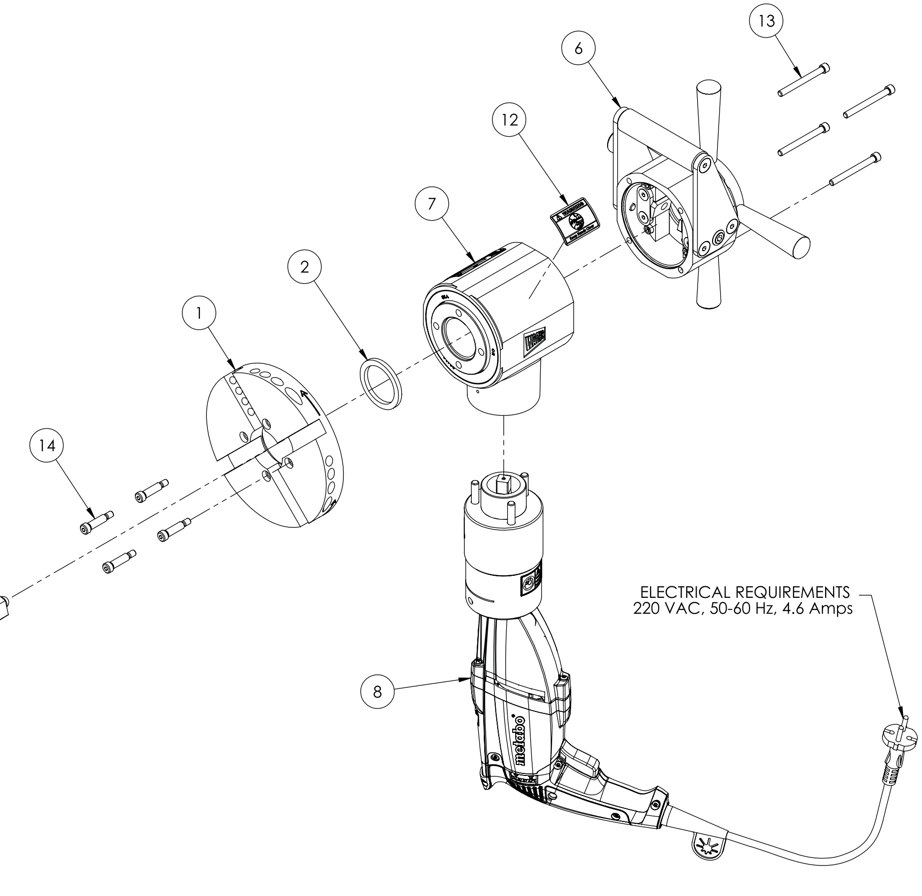
NOTES:
1. SHIPPED LOOSE WITH MACHINE:
   (2) 56-043-00 WIPER, FELT
2. SHIPPING DIMENSIONS: 33.36" [847.3mm] LENGTH X 28.44" [722.4mm] WIDTH X 18.23" [463.0mm] HEIGHT

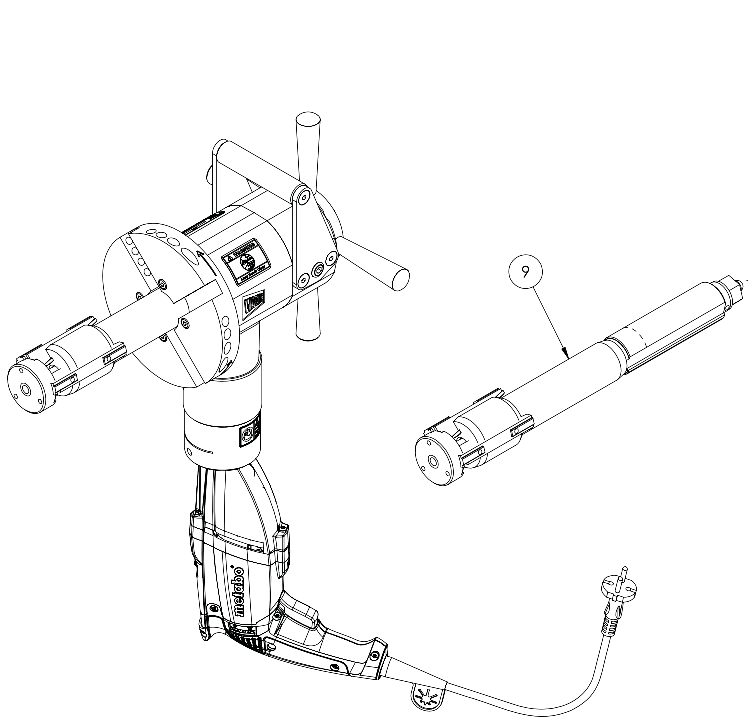


SDB 206, 220 V Electric (56-000-04)

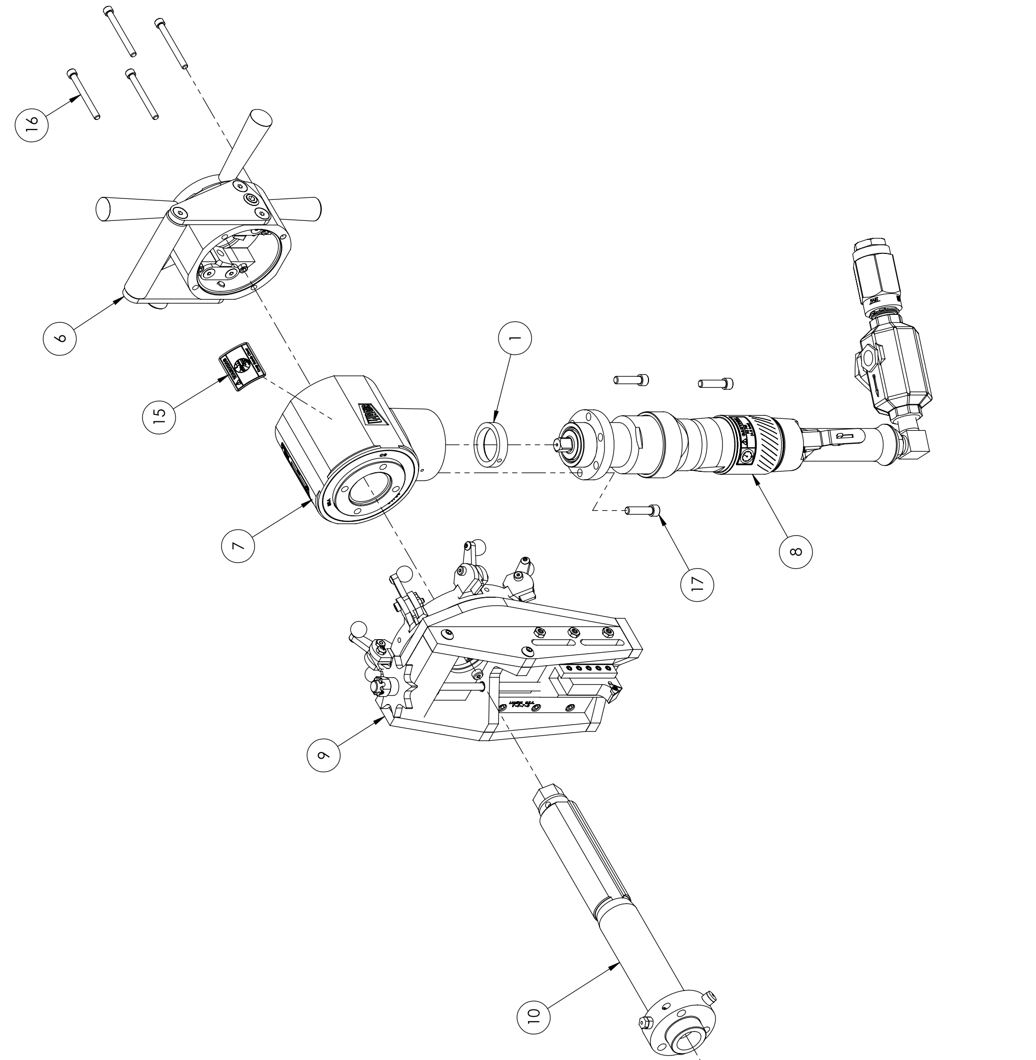
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-005-00	1	HEAD, ROTATING
2	56-043-00	3	WIPER, FELT
3	56-099-00	1	LABEL (NOT SHOWN)
4	56-214-00	1	INSERT, FOAM (NOT SHOWN)
5	56-215-00	1	CASE, STORAGE (NOT SHOWN)
6	56-300-01	1	REAR CAP ASSEMBLY W/ADJUSTABLE KEY
7	56-301-01	1	BEARING HOUSING ASSEMBLY
8	56-413-02	1	SDB 206/2 ELECT. DRIVE ASSEMBLY-220V
9	56-430-00	1	SDB 206 MANDREL AND LEG ASSEMBLY
10	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
11	56-MAN-01	1	MANUAL (NOT SHOWN)
12	66-147-00	1	LABEL, WARNING
13	90-050-25	4	SHCS 1/4-20 X 2.5
14	90-067-59	4	BOLT, STRIPPER 5/16 X 1
15	90-800-06	1	WRENCH, 5/64-1/4 HEX SET (NOT SHOWN)
16	90-800-29	1	WRENCH, 1-1/8 COMBINATION (NOT SHOWN)
17	90-800-62	1	WRENCH, 3/16 HEX 9" TEE HANDLE (NOT SHOWN)

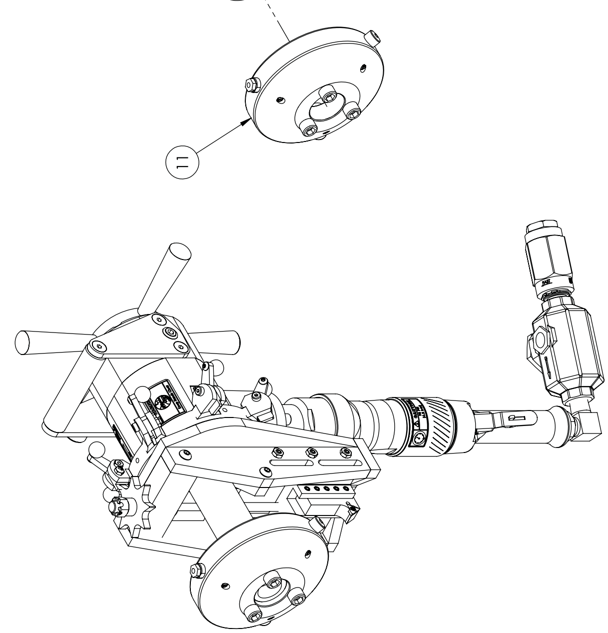
NOTES:
1. SHIPPED LOOSE WITH MACHINE: (2) 56-043-00 WIPER, FELT
2. SHIPPING DIMENSIONS: 33.36" [847.3mm] LENGTH X 28.44" [722.4mm] WIDTH X 18.23" [463.0mm] HEIGHT
3. SEE 56-000-02 SHEET 2 OF 2 FOR ENVELOPE DIMENSIONS.





FF 313 Flange Facer (56-000-FF)

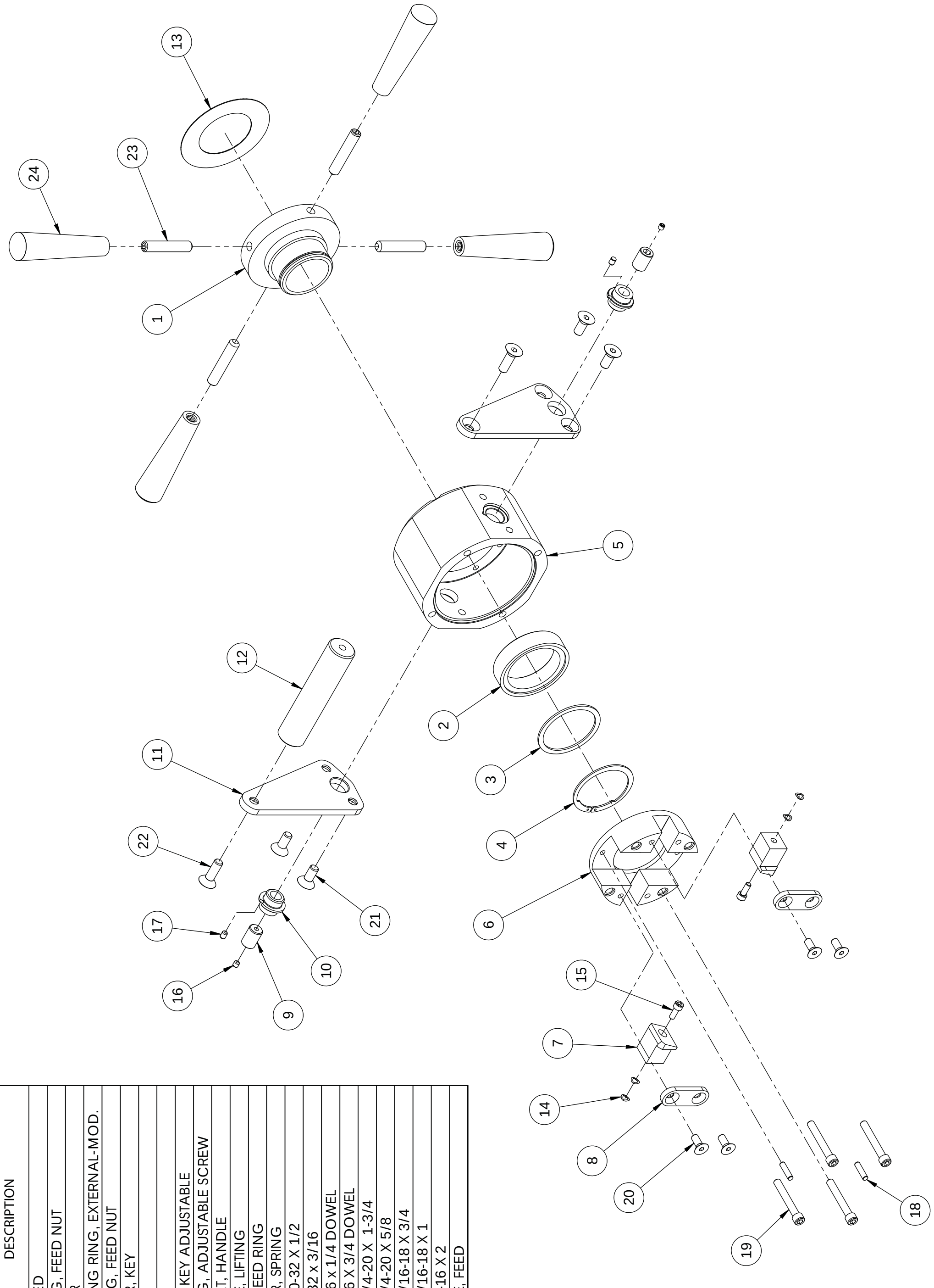




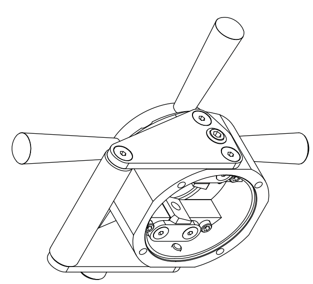
NOTES:
1. SHIPPED LOOSE WITH MACHINE:
   (3) 56-043-00 WIPER, FELT
2. SHIPPING DIMENSIONS: 33.36" [847.3mm] LENGTH X 28.44" [722.4mm] WIDTH X 18.23" [463.0mm] HEIGHT

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-010-00	1	RING, SPACER
2	56-043-00	3	WIPER, FELT (NOT SHOWN)
3	56-100-00	1	LABEL, CASE-FF (NOT SHOWN)
4	56-214-00	1	INSERT, FOAM (NOT SHOWN)
5	56-215-00	1	CASE, STORAGE (NOT SHOWN)
6	56-300-01	1	REAR CAP ASSEMBLY W/ADJUSTABLE KEY
7	56-301-01	1	BEARING HOUSING ASSEMBLY
8	56-302-00	1	AIR MOTOR ASSEMBLY
9	56-404-00	1	SINGLE POINT SLIDE ASSEMBLY (3" TO 13" DIA.)
10	56-414-01	1	FF313 FITTING MANDREL ASSEMBLY
11	56-415-00	1	FF313 MANDREL ADAPTER ASSEMBLY
12	56-LIT-01	1	TOOLING CHART, END PREP (NOT SHOWN)
13	56-MAN-FF	1	MANUAL, FF313 (NOT SHOWN)
14	60-227-00	1	TOOL BOX (NOT SHOWN)
15	66-147-00	1	LABEL, WARNING
16	90-050-25	4	SHCS 1/4-20 X 2.5
17	90-060-12	3	SHCS, 5/16-18 X 1-1/4
18	90-800-06	1	WRENCH, 5/64 - 1/4 HEX SET (NOT SHOWN)
19	90-800-29	1	WRENCH, 1 - 1/8 COMBINATION (NOT SHOWN)
20	90-800-62	1	WRENCH, 3/16 HEX 9" TEE HANDLE (NOT SHOWN)

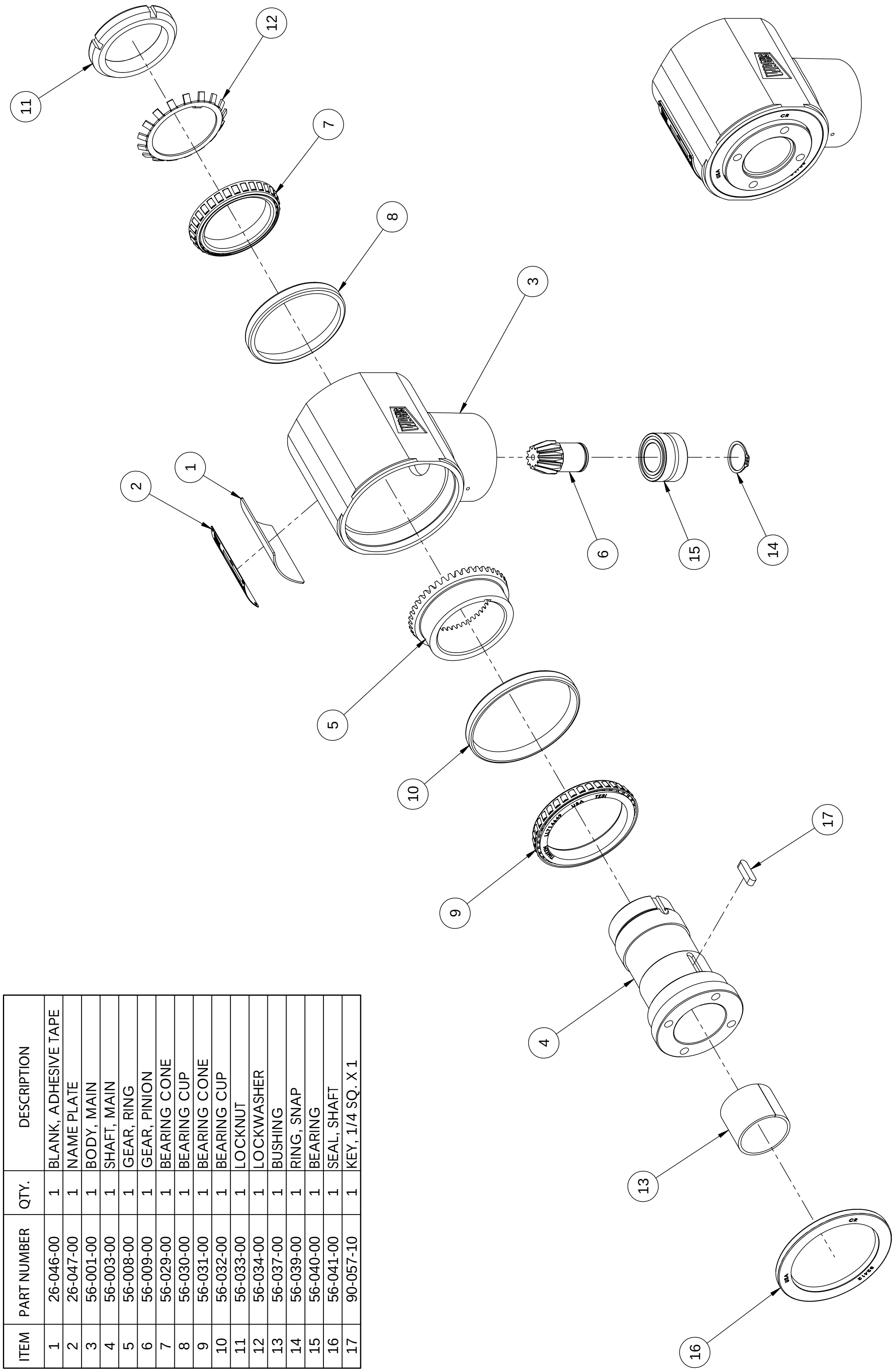
Rear Cap Assembly (56-300-01)



ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-007-00	1	NUT, FEED
2	56-013-00	1	BEARING, FEED NUT
3	56-027-00	1	WASHER
4	56-038-10	1	RETAINING RING, EXTERNAL-MOD.
5	56-180-00	1	HOUSING, FEED NUT
6	56-181-00	1	COLLAR, KEY
7	56-182-00	2	KEY
8	56-183-00	2	STRAP
9	56-184-00	2	SCREW, KEY ADJUSTABLE
10	56-185-00	2	BUSHING, ADJUSTABLE SCREW
11	56-186-00	2	BRACKET, HANDLE
12	56-187-00	1	HANDLE, LIFTING
13	56-189-00	1	LABEL, FEED RING
14	66-140-00	4	WASHER, SPRING
15	90-040-55	2	SHCS, 10-32 X 1/2
16	90-044-51	2	SSS, 10-32 x 3/16
17	90-046-02	2	PIN, 3/16 x 1/4 DOWEL
18	90-046-07	2	PIN, 3/16 X 3/4 DOWEL
19	90-050-17	4	SHCS, 1/4-20 X 1-3/4
20	90-053-06	4	FHCS, 1/4-20 X 5/8
21	90-063-07	4	FHCS, 5/16-18 X 3/4
22	90-063-10	2	FHCS, 5/16-18 X 1
23	90-074-20	4	SSS, 3/8-16 X 2
24	90-900-58	4	HANDLE, FEED

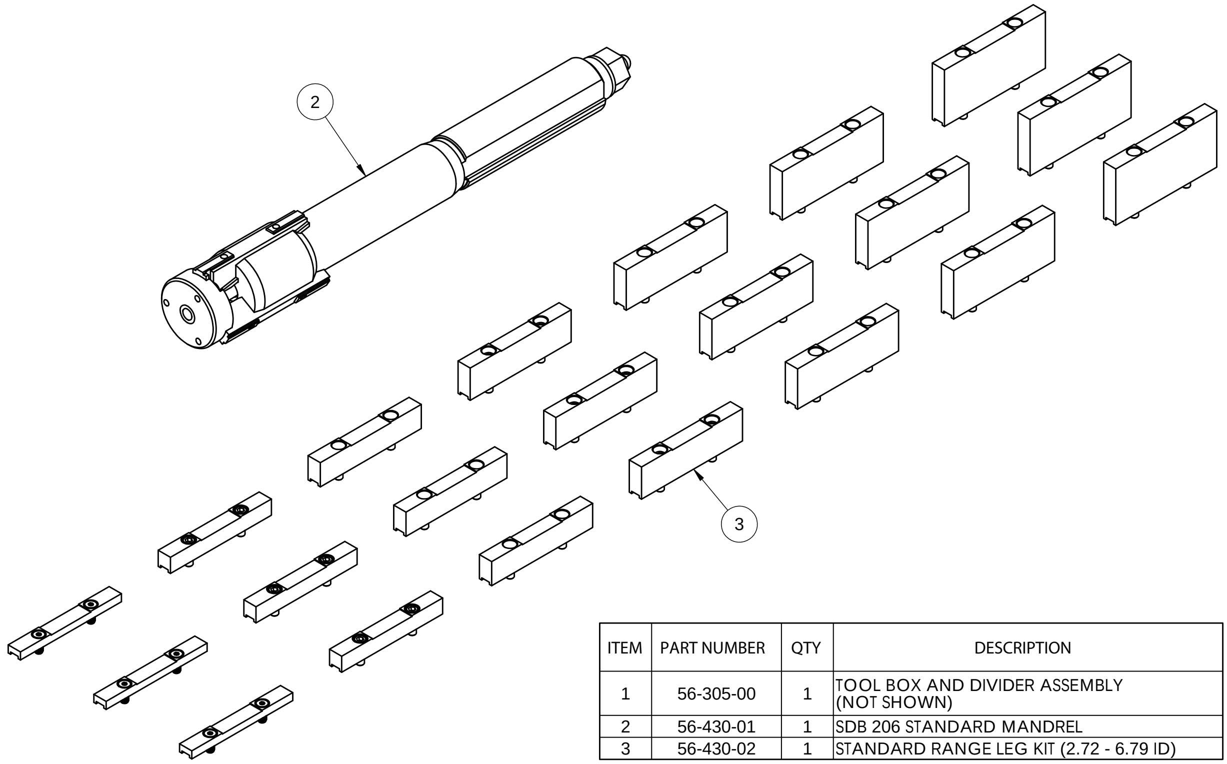


Bearing Housing Assembly (56-301-01)



ITEM	PART NUMBER	QTY.	DESCRIPTION
1	26-046-00	1	BLANK, ADHESIVE TAPE
2	26-047-00	1	NAME PLATE
3	56-001-00	1	BODY, MAIN
4	56-003-00	1	SHAFT, MAIN
5	56-008-00	1	GEAR, RING
6	56-009-00	1	GEAR, PINION
7	56-029-00	1	BEARING CONE
8	56-030-00	1	BEARING CUP
9	56-031-00	1	BEARING CONE
10	56-032-00	1	BEARING CUP
11	56-033-00	1	LOCKNUT
12	56-034-00	1	LOCKWASHER
13	56-037-00	1	BUSHING
14	56-039-00	1	RING, SNAP
15	56-040-00	1	BEARING
16	56-041-00	1	SEAL, SHAFT
17	90-057-10	1	KEY, 1/4 SQ. X 1

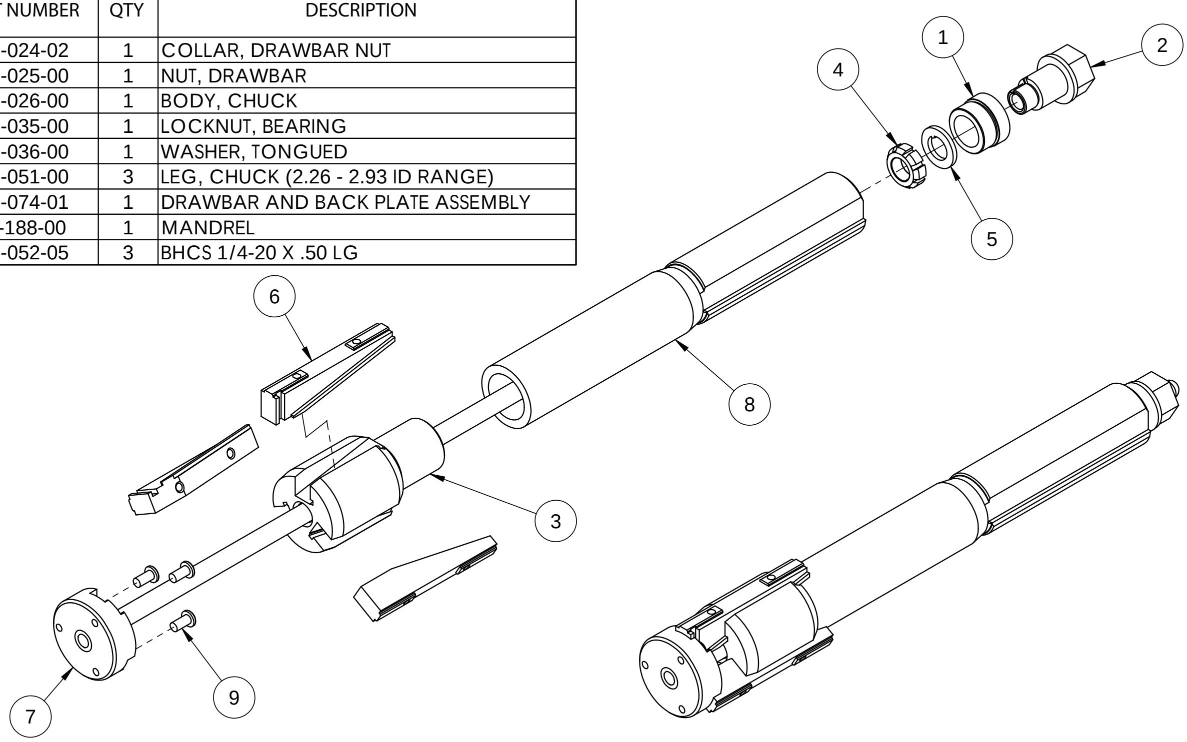
Mandrel Assembly (56-430-00)



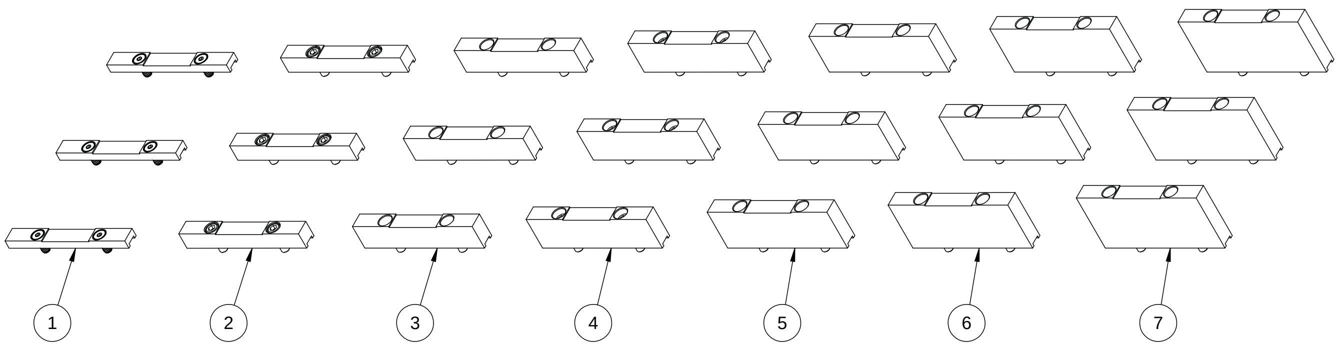
ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-305-00	1	TOOL BOX AND DIVIDER ASSEMBLY (NOT SHOWN)
2	56-430-01	1	SDB 206 STANDARD MANDREL
3	56-430-02	1	STANDARD RANGE LEG KIT (2.72 - 6.79 ID)

Standard Mandrel (56-430-01)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-024-02	1	COLLAR, DRAWBAR NUT
2	56-025-00	1	NUT, DRAWBAR
3	56-026-00	1	BODY, CHUCK
4	56-035-00	1	LOCKNUT, BEARING
5	56-036-00	1	WASHER, TONGUED
6	56-051-00	3	LEG, CHUCK (2.26 - 2.93 ID RANGE)
7	56-074-01	1	DRAWBAR AND BACK PLATE ASSEMBLY
8	56-188-00	1	MANDREL
9	90-052-05	3	BHCS 1/4-20 X .50 LG

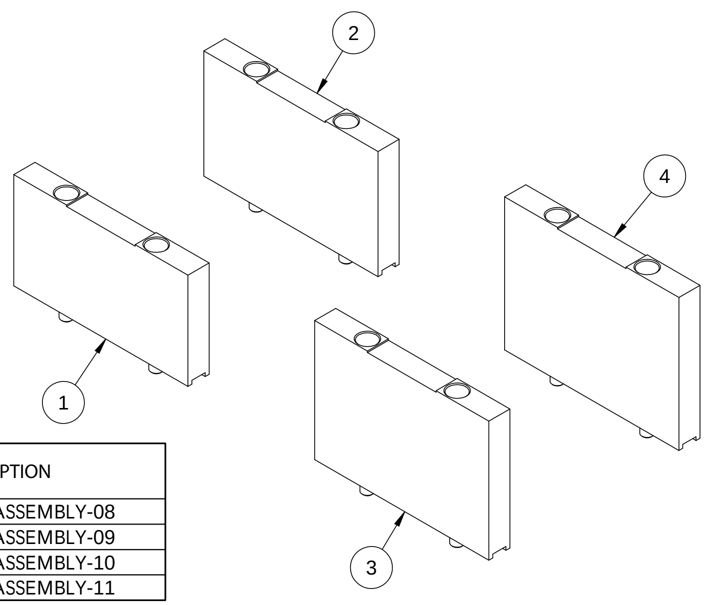


Leg Set, Standard Range (56-430-02)



ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-085-01	3	LEG EXTENSION ASSEMBLY-01
2	56-085-02	3	LEG EXTENSION ASSEMBLY-02
3	56-085-03	3	LEG EXTENSION ASSEMBLY-03
4	56-085-04	3	LEG EXTENSION ASSEMBLY-04
5	56-085-05	3	LEG EXTENSION ASSEMBLY-05
6	56-085-06	3	LEG EXTENSION ASSEMBLY-06
7	56-085-07	3	LEG EXTENSION ASSEMBLY-07

Leg Set, Extended Range (56-430-03)

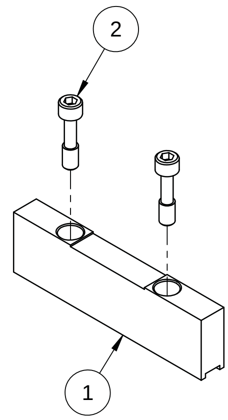


ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-085-08	1	LEG EXTENSION ASSEMBLY-08
2	56-085-09	1	LEG EXTENSION ASSEMBLY-09
3	56-085-10	1	LEG EXTENSION ASSEMBLY-10
4	56-085-11	1	LEG EXTENSION ASSEMBLY-11

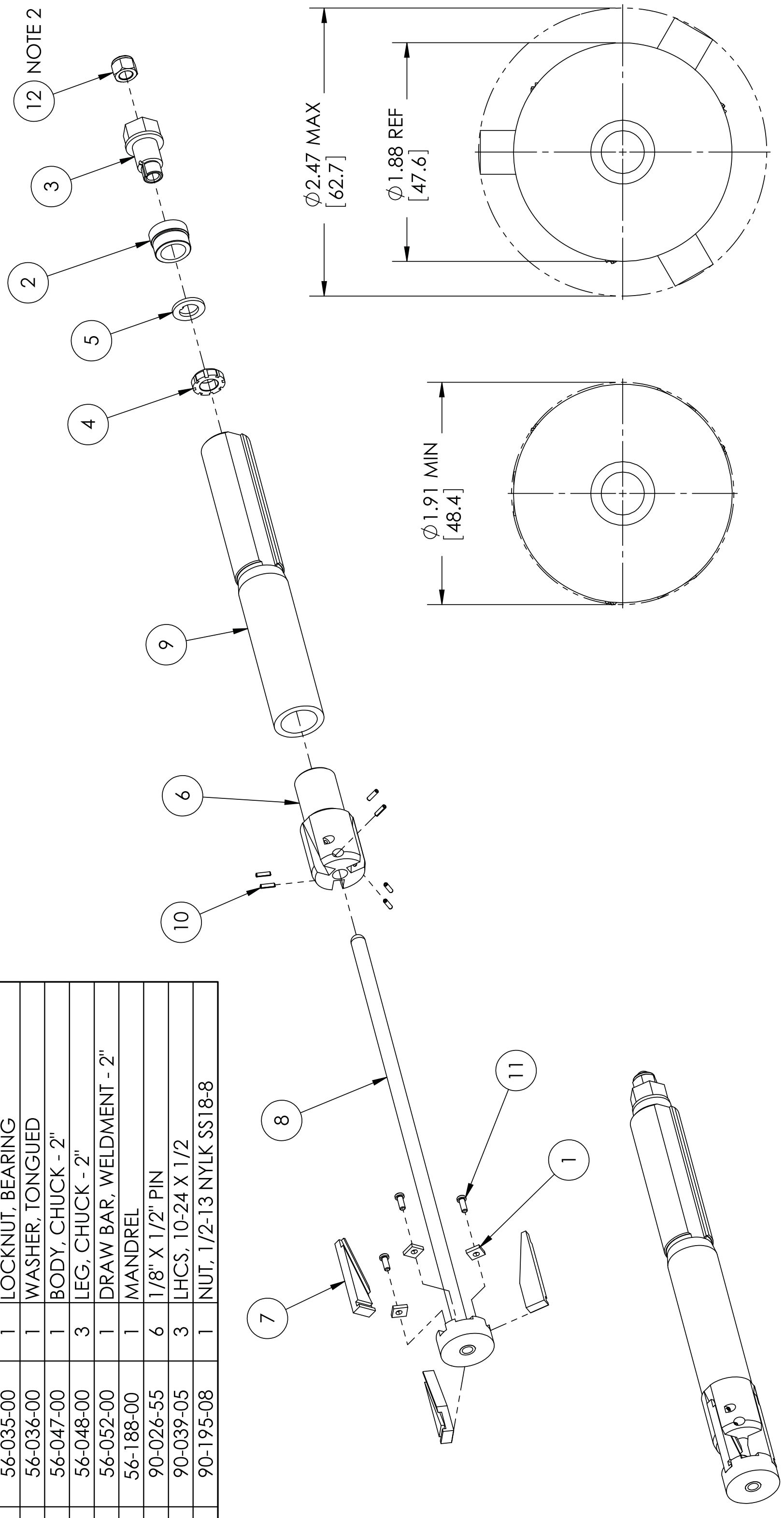
Extension Leg Assemblies (56-085-XX)

-TABLE-

ASSEMBLY NUMBER	ITEM	PART NUMBER	QTY	Ⓒ DESCRIPTION
56-085-01	1	56-083-01	1	EXTENSION LEG-01, 2.72 - 3.39 [69.1 - 86.0 mm]
	2	56-054-00	2	LHCS, 1/4-20 X 1/2 CAPTIVATED
56-085-02	1	56-083-02	1	EXTENSION LEG-02, 3.28 - 3.95 [83.4 - 100.4 mm]
	2	66-086-00	2	SHCS, 1/4-20 X 5/8 CAPTIVATED
56-085-03	1	56-083-03	1	EXTENSION LEG-03, 3.85 - 4.52 [97.7 - 114.8 mm]
	2	66-086-00	2	SHCS, 1/4-20 X 5/8 CAPTIVATED
56-085-04	1	56-083-04	1	EXTENSION LEG-04, 4.41 - 5.09 [112.1 - 129.3 mm]
	2	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED
56-085-05	1	56-083-05	1	EXTENSION LEG-05, 4.98 - 5.65 [126.5 - 143.6 mm]
	2	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED
56-085-06	1	56-083-06	1	EXTENSION LEG-06, 5.55 - 6.22 [140.9 - 158.0 mm]
	2	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED
56-085-07	1	56-083-07	1	EXTENSION LEG-07, 6.11 - 6.79 [155.3 - 172.4 mm]
	2	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED
56-085-08	1	56-083-08	1	EXTENSION LEG-08, 6.68 - 7.36 [169.7 - 186.9 mm]
	2	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED
56-085-09	1	56-083-09	1	EXTENSION LEG-09, 7.25 - 7.93 [184.2 - 201.3 mm]
	2	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED
56-085-10	1	56-083-10	1	EXTENSION LEG-10, 7.82 - 8.50 [198.6 - 215.9 mm]
	2	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED
56-085-11	1	56-083-11	1	EXTENSION LEG-11, 8.39 - 9.06 [213.1 - 230.2 mm]
	2	66-087-00	2	SHCS, 1/4-20 X 1 CAPTIVATED



Small I.D. Mandrel (56-402-01)



NOTES:
1. DIMENSIONS IN [BRACKETS] ARE MILLIMETER
2. THREAD LOCK ITEM 12 ONTO DRAWBAR AS STOP AT FULLY RETRACTED POSTION

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-019-00	3	TAB, LOCKING
2	56-024-02	1	COLLAR, DRAWBAR NUT
3	56-025-00	1	NUT, DRAWBAR
4	56-035-00	1	LOCKNUT, BEARING
5	56-036-00	1	WASHER, TONGUED
6	56-047-00	1	BODY, CHUCK - 2"
7	56-048-00	3	LEG, CHUCK - 2"
8	56-052-00	1	DRAW BAR, WELDMENT - 2"
9	56-188-00	1	MANDREL
10	90-026-55	6	1/8" X 1/2" PIN
11	90-039-05	3	LHCS, 10-24 X 1/2
12	90-195-08	1	NUT, 1/2-13 NYLK SS18-8

Fitting Mandrel Assembly (56-414-01)

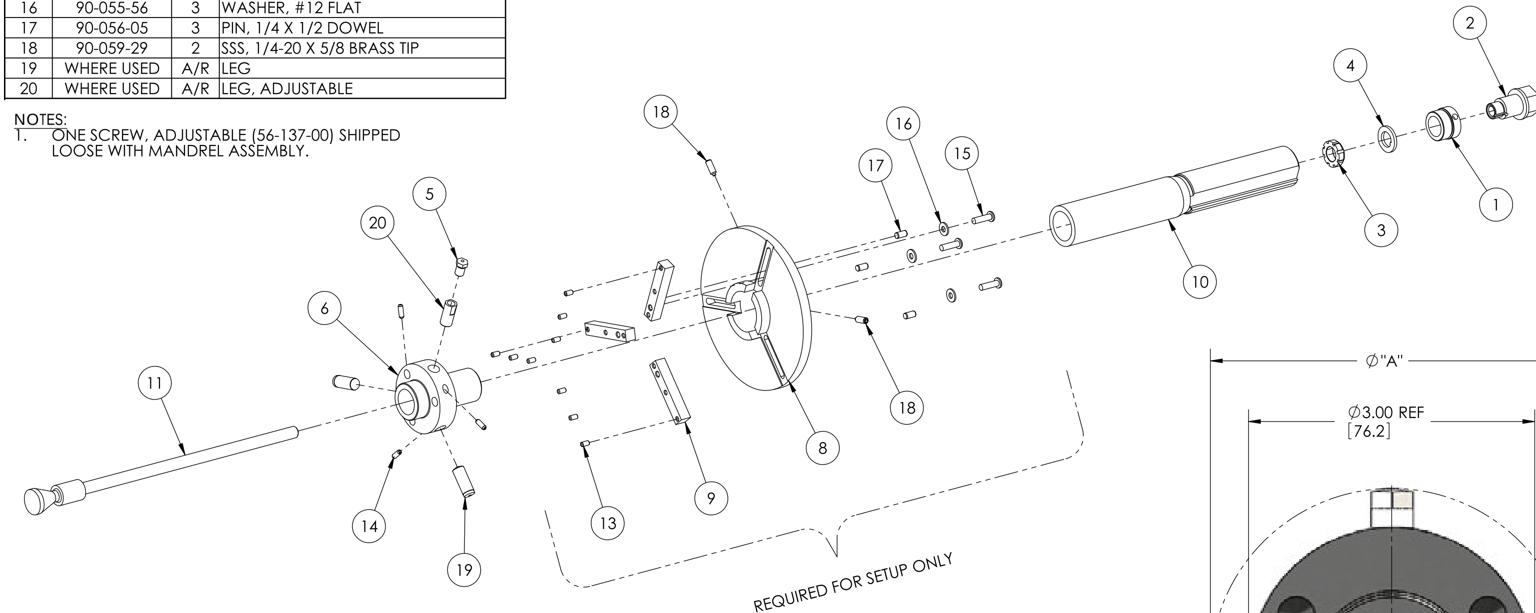
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-024-02	1	COLLAR, DRAWBAR NUT
2	56-025-00	1	NUT, DRAWBAR
3	56-035-00	1	LOCKNUT, BEARING
4	56-036-00	1	WASHER, TONGUED
5	56-137-00	2	SCREW, ADJUSTABLE
6	56-143-00	1	BODY, 3" CHUCK
7	56-167-00	1	LABEL, LEG (NOT SHOWN)
8	56-170-00	1	BODY, FIXTURE
9	56-171-00	3	LEG
10	56-188-00	1	MANDREL
11	56-207-00	1	DRAW ROD ASSEMBLY
12	56-212-00	1	STORAGE BLOCK SUB-ASSEMBLY (NOT SHOWN)
13	90-044-03	9	SSS, 10-24 X 3/8
14	90-049-11	3	PLUNGER, 10-32 X 1/2 BALL SS
15	90-052-08	3	BHCS 1/4-20 X .875 LG
16	90-055-56	3	WASHER, #12 FLAT
17	90-056-05	3	PIN, 1/4 X 1/2 DOWEL
18	90-059-29	2	SSS, 1/4-20 X 5/8 BRASS TIP
19	WHERE USED	A/R	LEG
20	WHERE USED	A/R	LEG, ADJUSTABLE

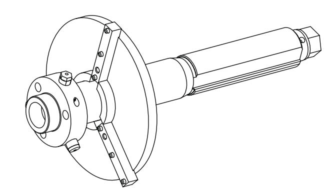
NOTES:
1. ONE SCREW, ADJUSTABLE (56-137-00) SHIPPED LOOSE WITH MANDREL ASSEMBLY.

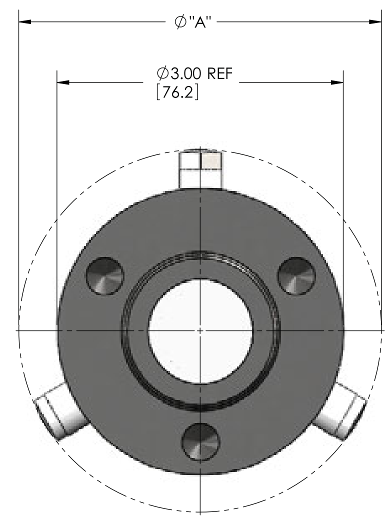
-WHERE USED-

ITEM	PART NO.	QTY.	DESCRIPTION	ITEM	PART NO.	QTY.	DESCRIPTION	DIMENSION "A" DIA.	
								MIN.	MAX.
19	56-135-04	2	LEG 1.35 [34.3]	20	56-136-04	1	LEG, ADJUSTABLE 1.15 [29.2]	3.18 [80.7]	3.66 [92.9]
	56-135-05		LEG 1.55 [39.4]		56-136-05		LEG, ADJUSTABLE 1.35 [34.3]	3.58 [90.9]	4.06[103.0]
	56-135-06		LEG 1.75 [44.6]		56-136-06		LEG, ADJUSTABLE 1.55 [39.4]	3.98 [101.0]	4.46 [113.2]
	56-135-07		LEG 1.95 [49.5]		56-136-07		LEG, ADJUSTABLE 1.75 [44.6]	4.38 [111.2]	4.86 [123.4]
	56-135-08		LEG 2.15 [54.6]		56-136-08		LEG, ADJUSTABLE 1.95 [49.5]	4.78 [121.3]	5.26 [133.5]
	56-135-09		LEG 2.35 [59.7]		56-136-09		LEG, ADJUSTABLE 2.15 [54.6]	5.18 [131.5]	5.66 [143.7]
	56-135-10		LEG 2.55 [64.8]		56-136-10		LEG, ADJUSTABLE 2.35 [59.7]	5.58 [141.6]	6.06 [153.8]
	56-135-12	3	LEG 1.25 [31.8]		---		---	3.00 [76.2] BODY, CHUCK DIA.	3.46 [87.8]

DIMENSIONS IN BRACKETS ARE MILLIMETERS





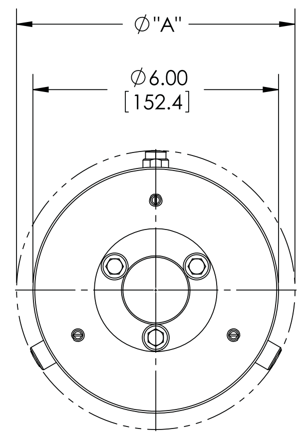


Mandrel Adapter Assembly (56-415-00)

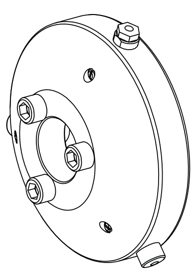
-WHERE USED-									
ITEM	PART NO.	QTY.	DESCRIPTION	ITEM	PART NO.	QTY.	DESCRIPTION	DIMENSION "A" DIA.	
								MIN.	MAX.
7	56-145-01	2	LEG 1.50 [38.1]	8	56-146-01	1	LEG, ADJUSTABLE 1.30 [33.0]	5.98 [151.9]	6.46 [164.0]
	56-145-02		LEG 1.70 [43.2]		56-146-02		LEG, ADJUSTABLE 1.50 [38.1]	6.38 [162.0]	6.86 [174.2]
	56-145-03		LEG 1.90 [48.3]		56-146-03		LEG, ADJUSTABLE 1.70 [43.2]	6.78 [172.2]	7.26 [184.4]
	56-145-04		LEG 2.10 [53.3]		56-146-04		LEG, ADJUSTABLE 1.90 [48.3]	7.18 [182.3]	7.66 [194.5]
	56-145-05		LEG 2.30 [58.4]		56-146-05		LEG, ADJUSTABLE 2.10 [53.3]	7.58 [192.5]	8.06 [204.7]
	56-145-06		LEG 2.50 [63.5]		56-146-06		LEG, ADJUSTABLE 2.30 [58.4]	7.98 [202.6]	8.46 [214.8]
	56-145-07		LEG 2.70 [68.6]		56-146-07		LEG, ADJUSTABLE 2.50 [63.5]	8.38 [212.8]	8.86 [225.0]
	56-145-08		LEG 2.90 [73.7]		56-146-08		LEG, ADJUSTABLE 2.70 [68.6]	8.78 [222.9]	9.26 [235.1]
	56-145-09		LEG 3.10 [78.7]		56-146-09		LEG, ADJUSTABLE 2.90 [73.7]	9.18 [233.1]	9.66 [245.3]
	56-145-10		LEG 3.30 [83.8]		56-146-10		LEG, ADJUSTABLE 3.10 [78.7]	9.58 [243.3]	10.06 [255.5]

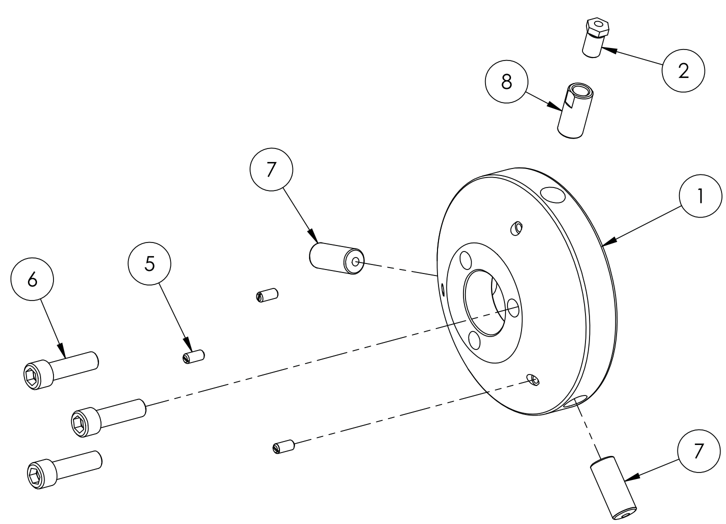
DIMENSIONS IN BRACKETS ARE MILLIMETERS

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-144-00	1	ADAPTER, 6" - 10" MANDREL
2	56-147-00	2	SCREW, 5/8" DIA. ADJUSTABLE
3	56-169-00	1	LABEL, LEG RANGE (NOT SHOWN)
4	56-219-00	1	STORAGE BLOCK SUB-ASSEMBLY (NOT SHOWN)
5	90-059-18	3	PLUNGER, 1/4-20 x 1/2 HVY-SPRNG BALL
6	90-080-15	3	SHCS, 7/16-20 X 1-1/2
7	WHERE USED	A/R	LEG
8	WHERE USED	A/R	LEG, ADJUSTABLE



NOTES:
1. ONE SCREW, ADJUSTABLE (56-147-00) SHIPPED LOOSE WITH MANDREL ADAPTER ASSEMBLY.



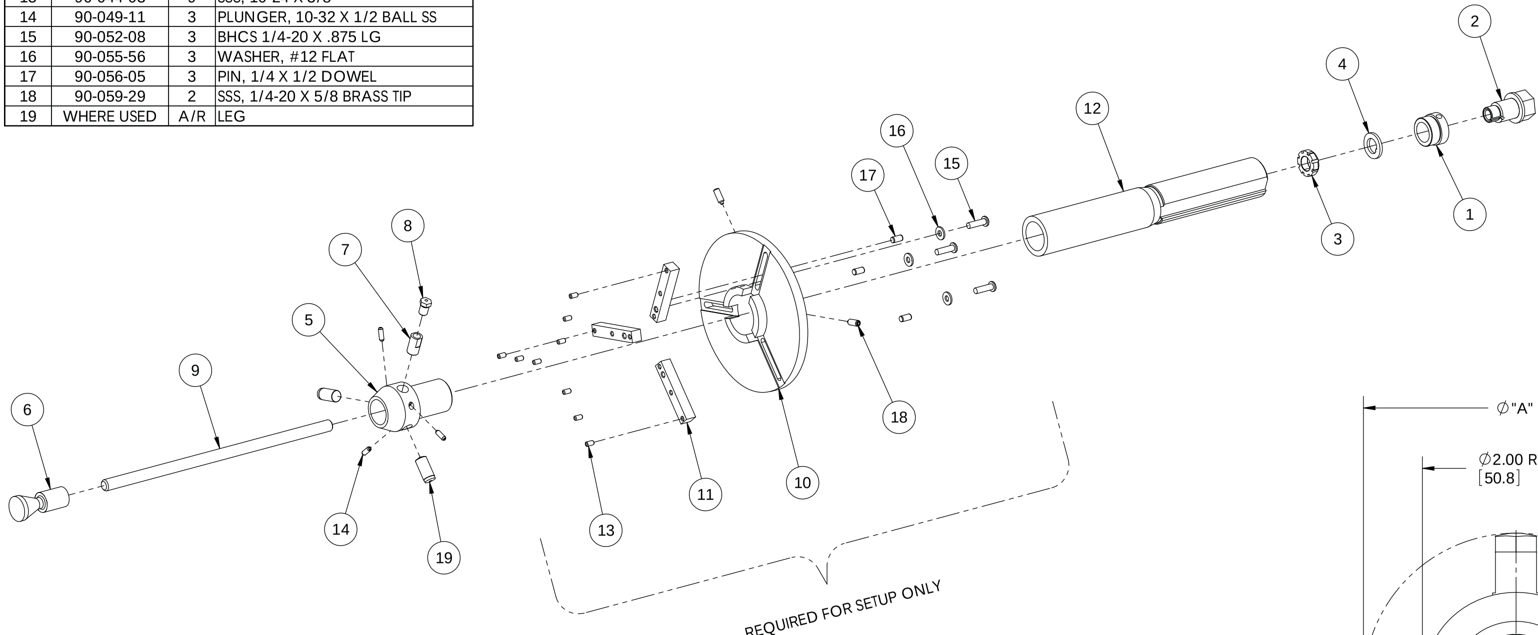


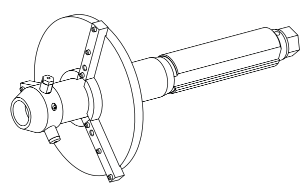
Fitting Mandrel 2"-3" (56-416-01)

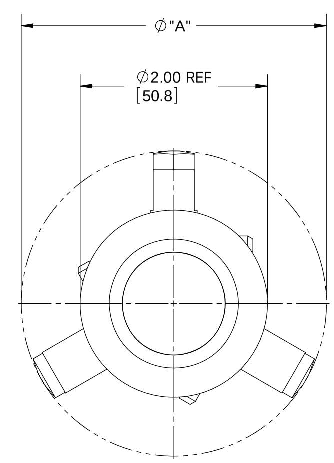
ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-024-02	1	COLLAR, DRAWBAR NUT
2	56-025-00	1	NUT, DRAWBAR
3	56-035-00	1	LOCKNUT, BEARING
4	56-036-00	1	WASHER, TONGUED
5	56-133-00	1	BODY, CHUCK
6	56-134-00	1	CONE
7	56-136-03	1	LEG, ADJUSTABLE
8	56-137-00	1	SCREW, ADJUSTABLE
9	56-138-00	1	ROD, DRAW
10	56-170-00	1	BODY, FIXTURE
11	56-171-00	3	LEG
12	56-188-00	1	MANDREL
13	90-044-03	9	SSS, 10-24 X 3/8
14	90-049-11	3	PLUNGER, 10-32 X 1/2 BALL SS
15	90-052-08	3	BHCS 1/4-20 X .875 LG
16	90-055-56	3	WASHER, #12 FLAT
17	90-056-05	3	PIN, 1/4 X 1/2 DOWEL
18	90-059-29	2	SSS, 1/4-20 X 5/8 BRASS TIP
19	WHERE USED	A/R	LEG

-WHERE USED-					
ITEM	PART NO.	QTY.	DESCRIPTION	DIMENSION "A" DIA.	
				MIN.	MAX.
19	56-135-01	3	LEG, .75 [19.1]	2.00 [50.8] BODY, CHUCK DIA.	2.46 [62.5]
	56-135-02	3	LEG, .95 [24.1]	2.38 [60.4]	2.86 [72.6]
	56-135-03	2	LEG, 1.15 [29.2]	2.78 [70.6]	3.26 [82.8]

DIMENSIONS IN BRACKETS ARE MILLIMETERS

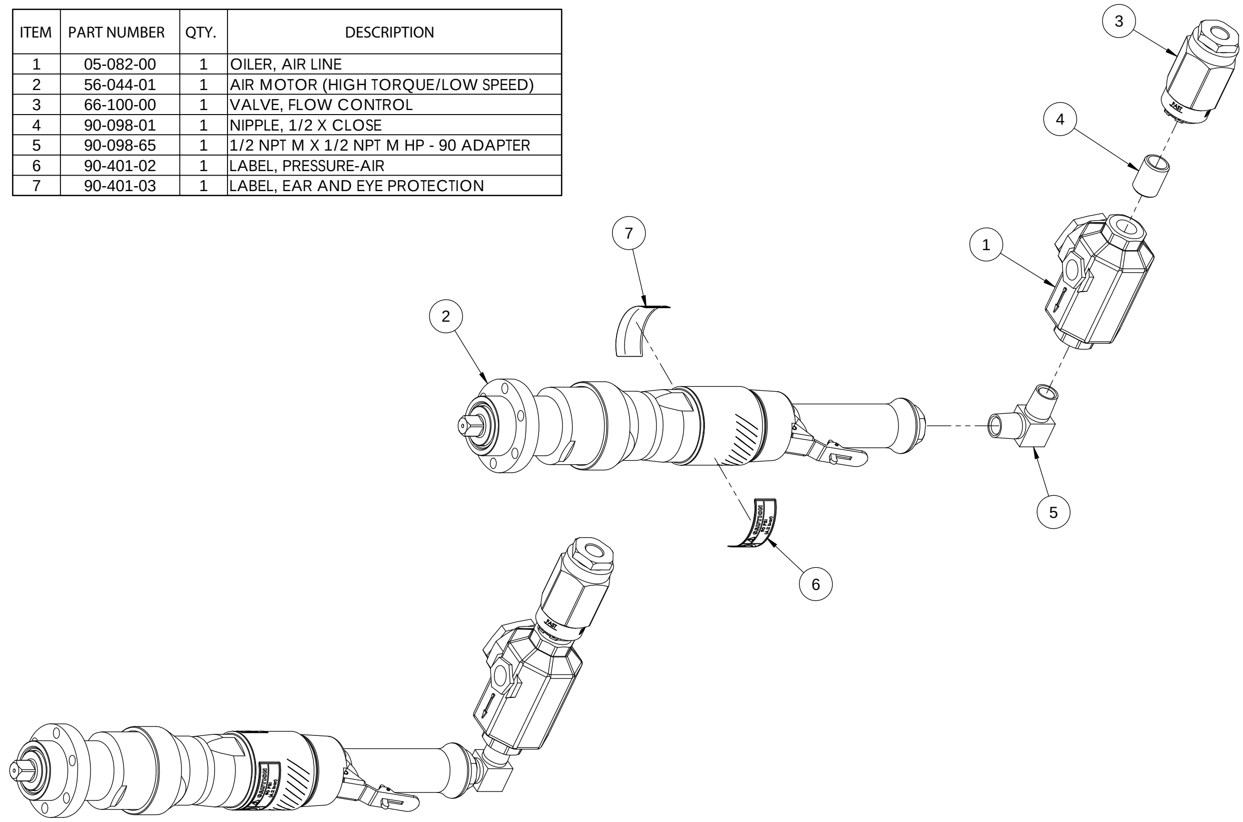




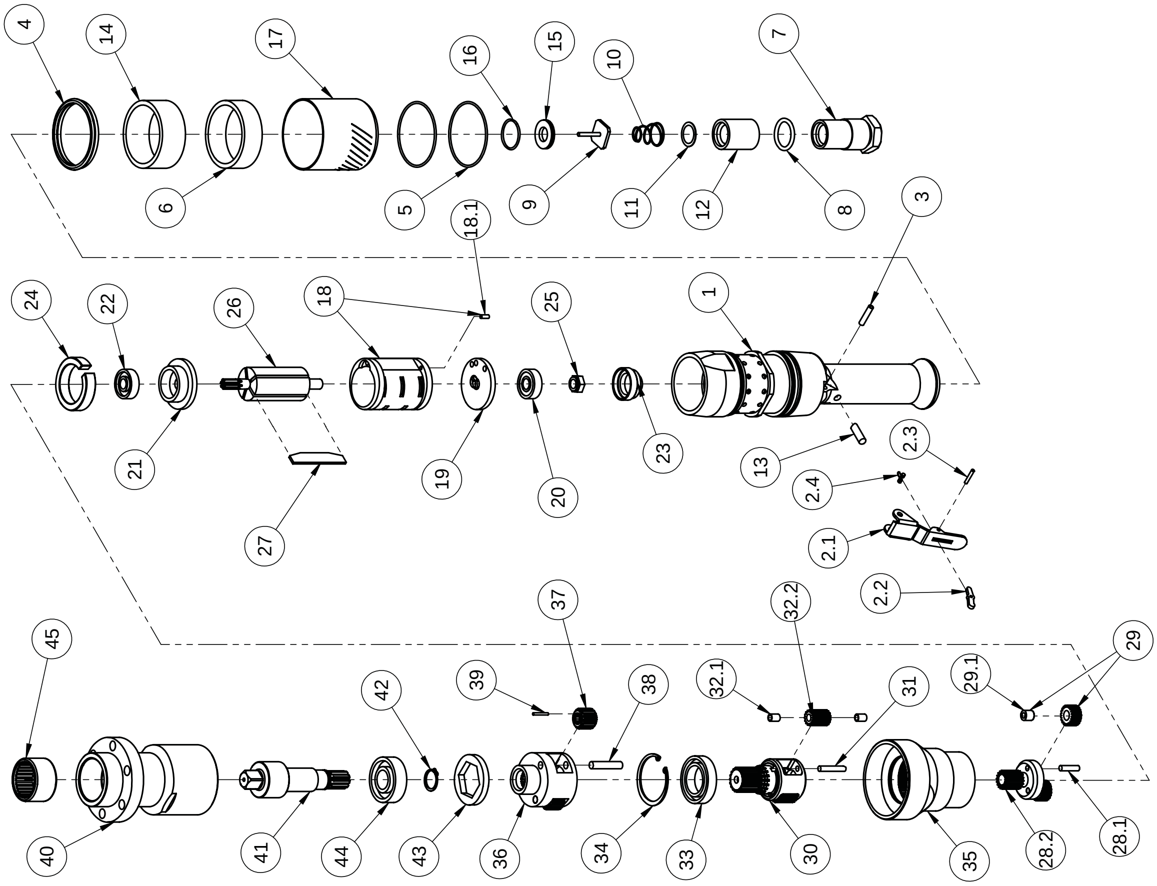


Air Drive Assembly (56-302-00)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	05-082-00	1	OILER, AIR LINE
2	56-044-01	1	AIR MOTOR (HIGH TORQUE/LOW SPEED)
3	66-100-00	1	VALVE, FLOW CONTROL
4	90-098-01	1	NIPPLE, 1/2 X CLOSE
5	90-098-65	1	1/2 NPT M X 1/2 NPT M HP - 90 ADAPTER
6	90-401-02	1	LABEL, PRESSURE-AIR
7	90-401-03	1	LABEL, EAR AND EYE PROTECTION

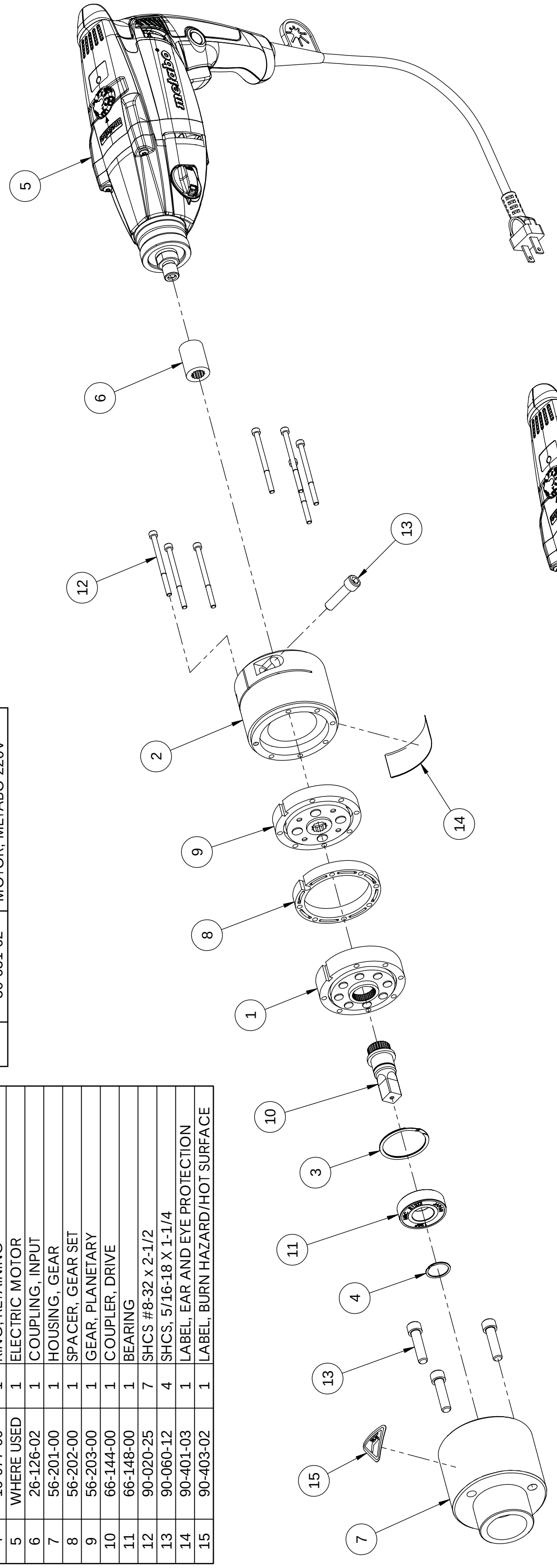


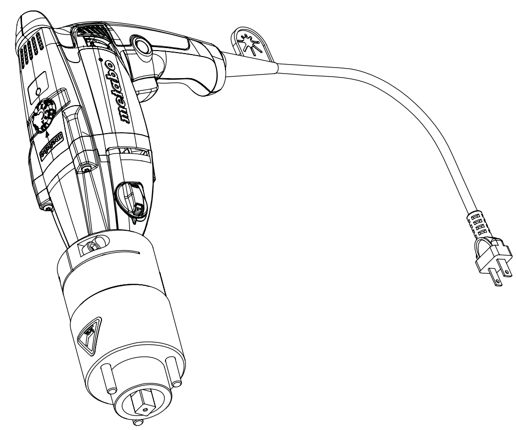
Air Motor (56-044-01)



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	CLE-203110	HANDLE	1
2	CLE-201638	SUBASSY; LOCKOFF LEVER	1
2.1	CLE-204178	LEVER; LOCKOFF	1
2.2	CLE-202105	TOGGLE	1
2.3	CLE-845409	PIN; SPRING	1
2.4	CLE-869855	SPRING; TOGGLE	1
3	CLE-864195	PIN; LEVER	1
4	CLE-202011	SEAL RING	1
5	CLE-617754	O-RING	2
6	CLE-203109	PAD; MUFFLER	1
7	CLE-869933	BUSHING; INLET	1
8	CLE-622881	O-RING	1
9	CLE-202055	THROTTLE VALVE	1
10	CLE-864973	SPRING; THROTTLE VALVE	1
11	CLE-843656	SCREEN	1
12	CLE-202508	INLET SPACER	1
13	CLE-202481	PIN; VALVE	1
14	CLE-202632	PAD; MUFFLER	1
15	CLE-869931	SEAT; THROTTLE VALVE	1
16	CLE-622062	O-RING	1
17	CLE-202626	DEFLECTOR; EXHAUST	1
18	CLE-203101	CYLINDER	1
18.1	CLE-863887	PIN; SLOTTED SPRING	1
19	CLE-869572	PLATE; REAR BEARING	1
20	CLE-843444	BEARING; BALL	1
21	CLE-867536	PLATE; FRONT BEARING	1
22	CLE-619377	BEARING	1
23	CLE-203989	BEARING CAP	1
24	CLE-869059	MOTOR SPACER	1
25	CLE-865352	ROTOR LOCK NUT	1
26	CLE-203102	ROTOR	1
27	CLE-869569	ROTOR BLADE	5
28	CLE-861485	SPIDER; OPEN	1
28.1	CLE-832125	IDLE GEAR PIN	3
28.2	CLE-867532	GEAR SPIDER	1
29	CLE-867526	GEAR; IDLER	3
29.1	CLE-844774	BEARING; NEEDLE (B-36)	1
30	CLE-203698	2ND RED. SPIDER	1
31	CLE-204809	2ND GEAR PIN (3/16 DOWEL)	3
32	CLE-203107	IDLER GEAR; 2ND RED.	3
32.1	CLE-203062	BUSHING	2
32.2	CLE-846659	GEAR 20T, IDLER GEAR	1
33	CLE-865198	BALL BEARING	1
34	CLE-203699	RING; RETAINING	1
35	CLE-203696	GEAR CASE	1
36	CLE-869905	SPIDER; CAGE	1
37	CLE-869903	2ND RED IDGEAR	3
38	CLE-869908	GEAR SHAFT	3
39	CLE-869907	NEEDLE ROLLER	39
40	CLE-203697	GEAR CASE	1
41	CLE-203137	SPINDLE	1
42	CLE-882115	RETAINING RING	1
43	CLE-869877	BEARING RETAIN	1
44	CLE-619466	BALL BEARING	1
45	CLE-202536	SPINDLE BEARING	1

Electric Drive Assembly 110 V (56-413-01) and 220 V (56-413-02)





Electric Drive Assembly
56-413-01, 110 V
56-413-02, 220 V

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	11-103-00	1	GEARBOX, PLANETARY OUTPUT
2	16-075-00	1	HOUSING, REAR
3	16-076-00	1	RING, RETAINING
4	16-077-00	1	RING, RETAINING
5	WHERE USED	1	ELECTRIC MOTOR
6	26-126-02	1	COUPLING, INPUT
7	56-201-00	1	HOUSING, GEAR
8	56-202-00	1	SPACER, GEAR SET
9	56-203-00	1	GEAR, PLANETARY
10	66-144-00	1	COUPLER, DRIVE
11	66-148-00	1	BEARING
12	90-020-25	7	SHCS #8-32 x 2-1/2
13	90-060-12	4	SHCS, 5/16-18 X 1-1/4
14	90-401-03	1	LABEL, EAR AND EYE PROTECTION
15	90-403-02	1	LABEL, BURN HAZARD/HOT SURFACE

-WHERE USED-

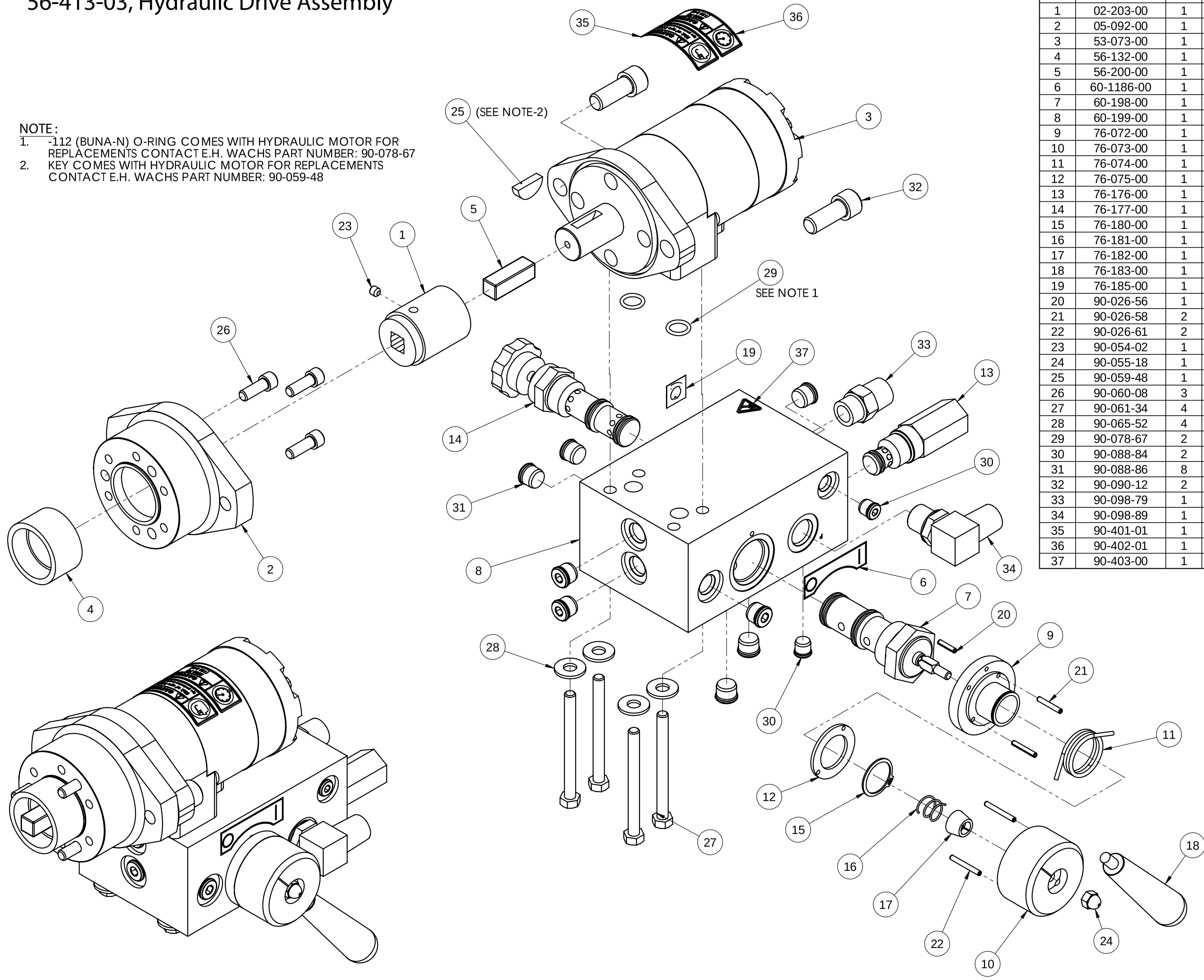
ITEM	PART NO.	DESCRIPTION
5	20-031-01	MOTOR, METABO 110V
	30-031-02	MOTOR, METABO 220V

Hydraulic Drive Assembly (56-413-03)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-203-00	1	ADAPTOR, DRIVE MOTOR
2	05-092-00	1	ADAPTOR, MOTOR (HYD.)
3	53-073-00	1	HYDRAULIC MOTOR
4	56-132-00	1	SPACER
5	56-200-00	1	KEY
6	60-1186-00	1	LCSF FLOW DIRECTION LABEL
7	60-198-00	1	VALVE, MRV DIRECTIONAL CONTROL
8	60-199-00	1	MANIFOLD, SDB HYDRAULIC
9	76-072-00	1	PLATE, MRV ANTI-ROTATION
10	76-073-00	1	CAP, MRV OPERATOR
11	76-074-00	1	SPRING, TORSION
12	76-075-00	1	PLATE, SPRING COVER
13	76-176-00	1	VALVE, PRESSURE RELIEF
14	76-177-00	1	VALVE, PRESSURE COMPENSATED FLOW CONTROL
15	76-180-00	1	RING, 26MM EXT RETAINING
16	76-181-00	1	DETENT SPRING
17	76-182-00	1	SPACER
18	76-183-00	1	HANDLE, 5/16"-18
19	76-185-00	1	FLOW CONTROL LABEL
20	90-026-56	1	PIN, 1/8 x 5/8 ROLL
21	90-026-58	2	PIN, 1/8 X 7/8 ROLL
22	90-026-61	2	PIN, 1/8 X 1.125 ROLL
23	90-054-02	1	SSS, 1/4-20 x 1/4
24	90-055-18	1	NUT, 1/4-20 ACORN
25	90-059-48	1	1/4 x 1 (#808) WOODDRUFF KEY
26	90-060-08	3	SHCS, 5/16-18 X 7/8
27	90-061-34	4	HHCS, 5/16-18 X 3-1/2"
28	90-065-52	4	WASHER, 5/16 FLAT
29	90-078-67	2	O-RING -112
30	90-088-84	2	PLUG, -04 ZERO-LEAK ORB
31	90-088-86	8	PLUG, -06 ZERO-LEAK ORB
32	90-090-12	2	SHCS, 1/2-13 X 1-1/4
33	90-098-79	1	ADAPTER, 1/2 NPT M X 1/2 ORB M - STRAIGHT
34	90-098-89	1	ELBOW, 1/2 ORB M X 1/2 NPT M - 90
35	90-401-01	1	LABEL, EYE PROTECTION
36	90-402-01	1	LABEL, PRESSURE-HYD.
37	90-403-00	1	LABEL, BURN HAZARD/HOT SURFACE

56-413-03, Hydraulic Drive Assembly

NOTE :
1. -112 (BUNA-N) O-RING COMES WITH HYDRAULIC MOTOR FOR REPLACEMENTS CONTACT E.H. WACHS PART NUMBER: 90-078-67
2. KEY COMES WITH HYDRAULIC MOTOR FOR REPLACEMENTS CONTACT E.H. WACHS PART NUMBER: 90-059-48

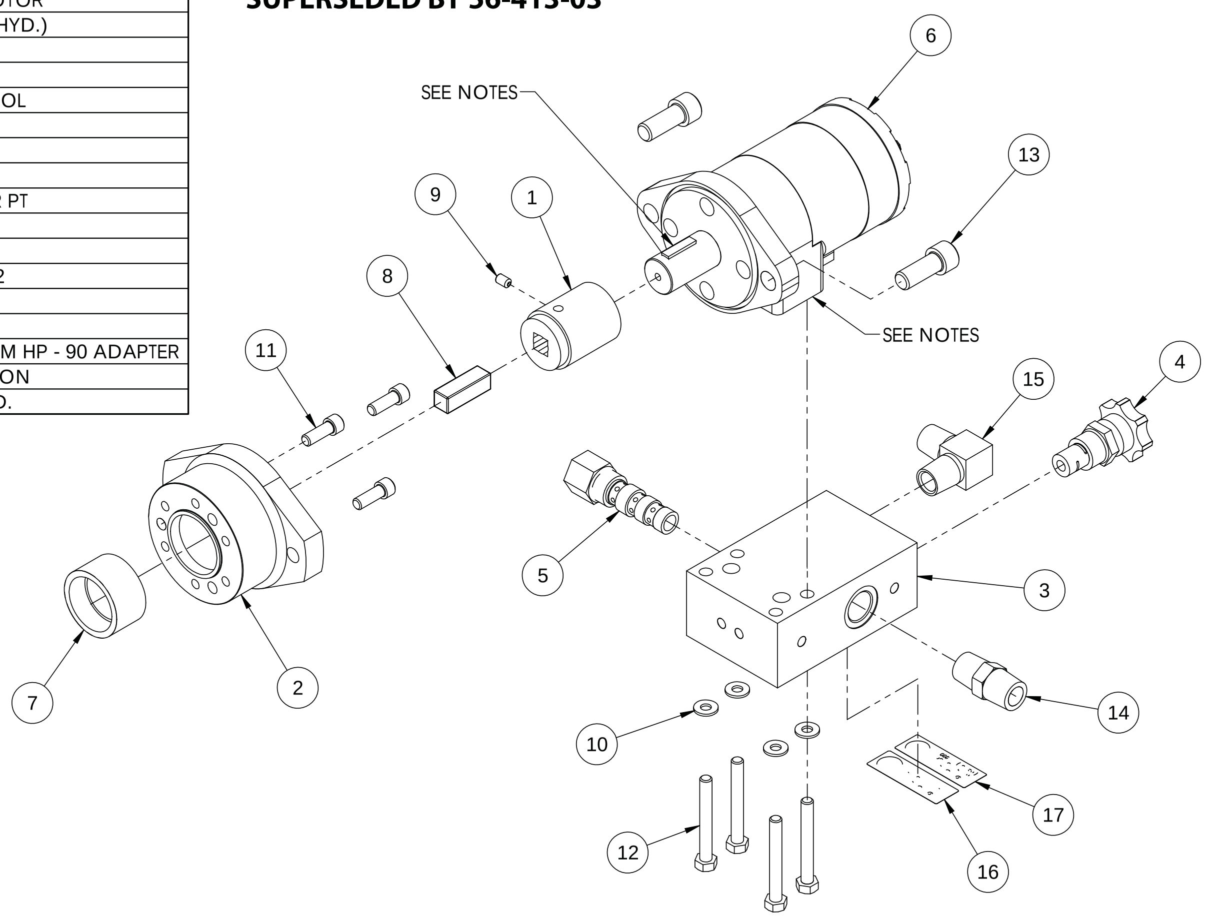


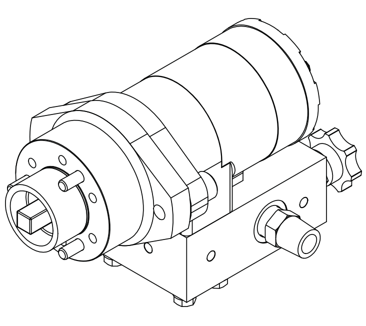
Hydraulic Drive (Obsolete) (56-413-00)

OBSOLETE
SUPERSEDED BY 56-413-03

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	02-203-00	1	ADAPTOR, DRIVE MOTOR
2	05-092-00	1	ADAPTOR, MOTOR (HYD.)
3	23-187-00	1	MANIFOLD
4	23-188-00	1	FLOW VALVE
5	23-189-00	1	COMPENSATOR SPOOL
6	53-073-00	1	HYDRAULIC MOTOR
7	56-132-00	1	SPACER
8	56-200-00	1	KEY
9	90-054-04	1	SSS, 1/4-20 X 3/8 KNR PT
10	90-055-53	4	WASHER, 1/4 FLAT
11	90-060-08	3	SHCS, 5/16-18 X 7/8
12	90-061-25	4	HHCS 5/16-18 X 2-1/2
13	90-090-12	2	SHCS, 1/2-13 X 1-1/4
14	90-098-58	1	1/2 HEX HP NIPPLE
15	90-098-65	1	1/2 NPT M X 1/2 NPT M HP - 90 ADAPTER
16	90-401-01	1	LABEL, EYE PROTECTION
17	90-402-01	1	LABEL, PRESSURE-HYD.

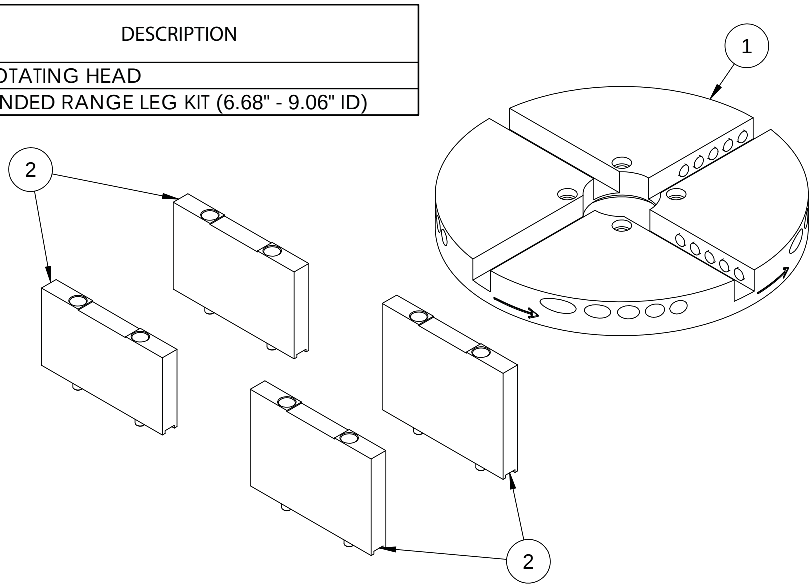
NOTES:
1. WOODDRUFF KEY AND O-RINGS SUPPLIED WITH HYDRAULIC MOTOR.
2. WOODRUFF KEY, PART NO.: 90-059-48
3. O-RING, PART NO.: 05-150-00





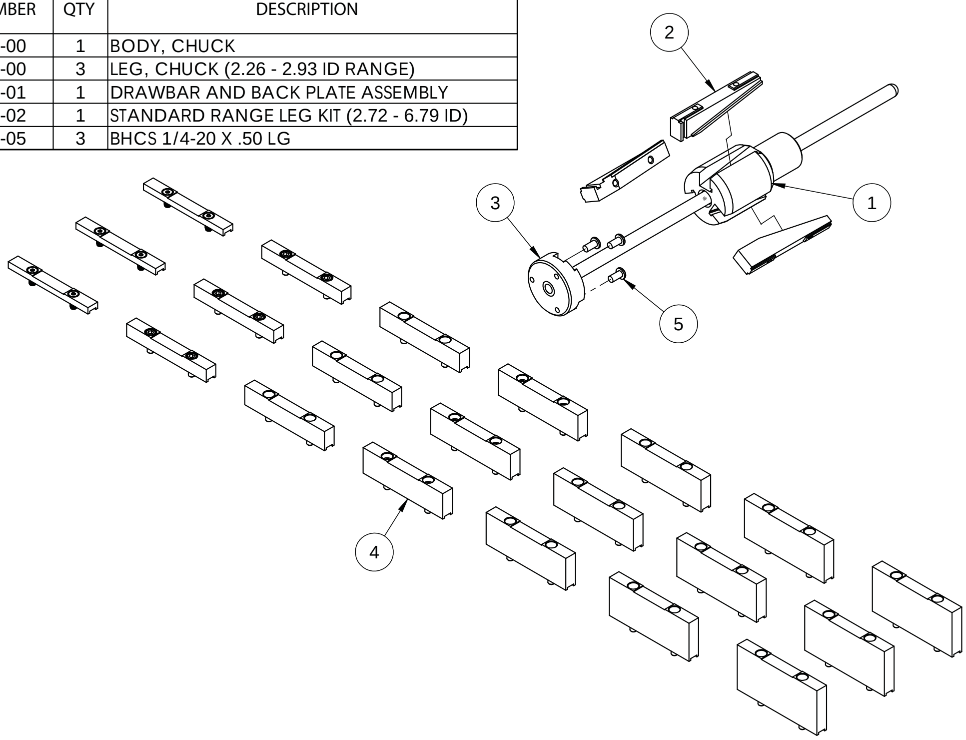
8” Head and Extended Range Leg Kit (56-407-02)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-076-00	1	8" ROTATING HEAD
2	56-430-03	1	EXTENDED RANGE LEG KIT (6.68" - 9.06" ID)

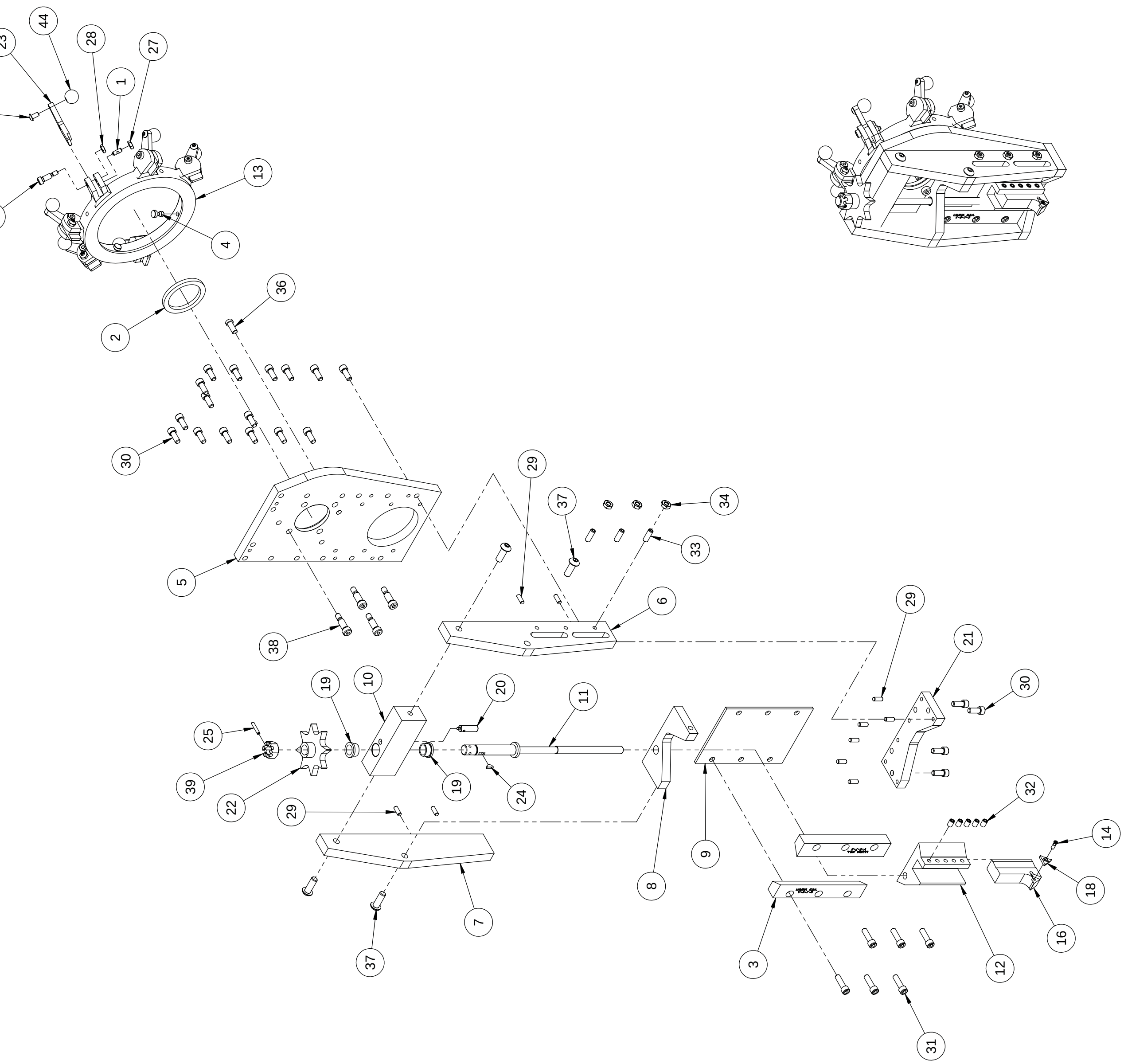


Replacement Chuck Body/Legs (56-310-00)

ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-026-00	1	BODY, CHUCK
2	56-051-00	3	LEG, CHUCK (2.26 - 2.93 ID RANGE)
3	56-074-01	1	DRAWBAR AND BACK PLATE ASSEMBLY
4	56-430-02	1	STANDARD RANGE LEG KIT (2.72 - 6.79 ID)
5	90-052-05	3	BHCS 1/4-20 X .50 LG



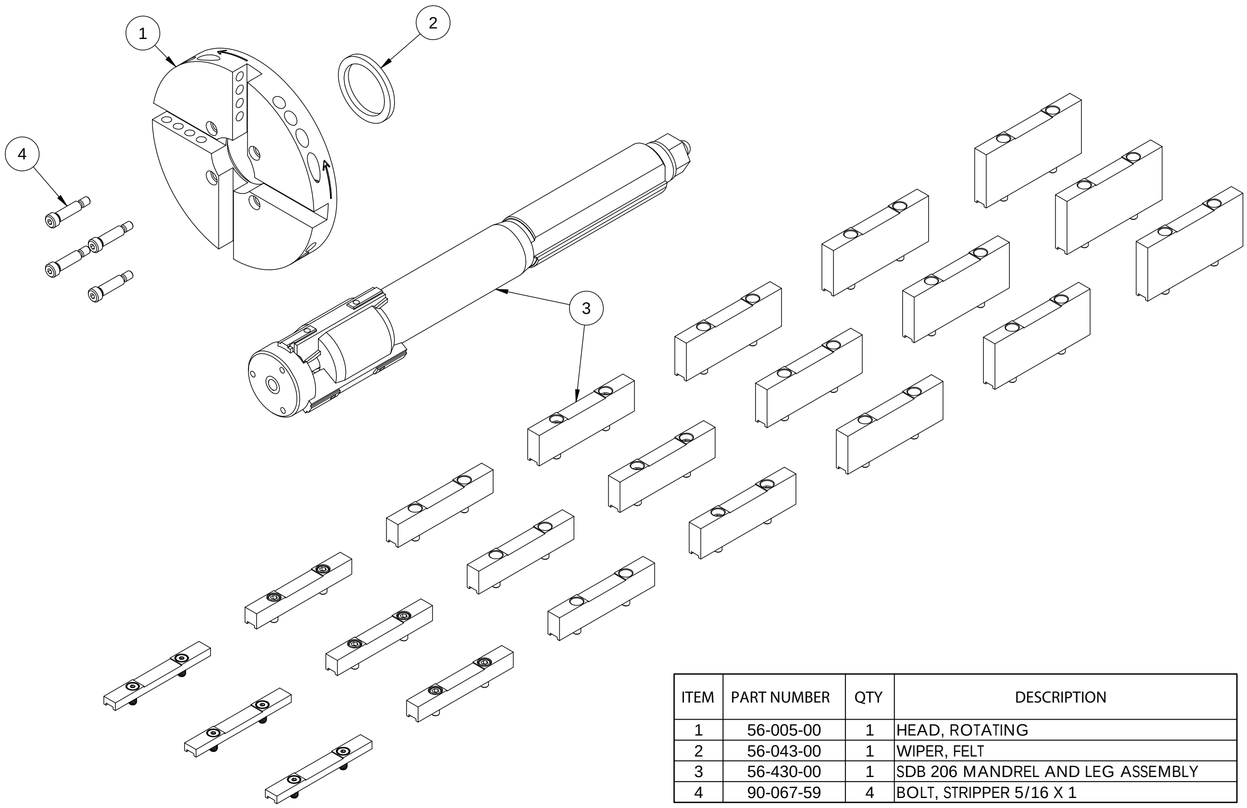
Single Point Slide Assembly (56-404-00)



NOTES:
1. ONE TOOL, INSERT (56-710-00) SHIPPED LOOSE WITH MACHINE.
2. ONE SCREW, INSERT (56-190-00) SHIPPED LOOSE WITH MACHINE.

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	52-140-00	6	PLUNGER, BALL
2	56-043-00	2	WIPER, FELT
3	56-066-00	2	GIB
4	56-073-00	4	SCREW, 1/4 TOGGLE
5	56-155-00	1	PLATE, BASE
6	56-156-00	1	STIFFENER, LEFT
7	56-157-00	1	STIFFENER, RIGHT
8	56-158-00	1	SUPPORT, BRIDGE
9	56-159-00	1	PLATE, SLIDE
10	56-160-00	1	BLOCK, FEED SCREW
11	56-161-00	1	SCREW, FEED
12	56-162-00	1	SLIDE, MALE
13	56-164-00	1	WELDMENT, TRIP COLLAR
14	56-190-00	2	SCREW, INSERT
15	56-191-00	2	WRENCH, TORX (NOT SHOWN)
16	56-194-00	1	HIGH RANGE TOOL HOLDER
17	56-195-00	1	LOW RANGE TOOL HOLDER (NOT SHOWN)
18	56-710-00	2	TOOL, INSERT
19	66-015-00	2	BEARING, FEED SCREW
20	66-019-00	2	PLUNGER, SPRING
21	66-109-00	1	SUPPORT, END
22	66-114-00	1	WHEEL, STAR
23	66-117-00	6	LEVER, TRIP
24	90-019-43	1	KEY, 3/32 X 3/8 WOODRUFF
25	90-026-57	1	PIN, 1/8 X 3/4 ROLL
26	90-042-04	6	BHCS, 10-32 X 3/8
27	90-045-01	6	NUT, 10-32 JAM
28	90-045-02	6	NUT, 10-24 JAM
29	90-046-05	12	PIN, .1875 x .500; DOWEL
30	90-050-06	20	SHCS, 1/4-20 X 5/8
31	90-050-08	6	SHCS, 1/4-20 X 7/8
32	90-054-04	5	SSS, 1/4-20 X 3/8 KNR PT
33	90-054-07	3	SSS, 1/4-20 X 3/4
34	90-055-04	3	NUT, 1/4-20 JAM
35	90-057-55	6	SHSB, 1/4 X 1/2
36	90-059-56	1	LHCS, 1/4-20 X 5/8
37	90-062-08	4	BHCS- 5/16-18 X 3/4
38	90-067-56	4	SHSB, 5/16 X 5/8
39	90-095-10	1	NUT, 1/2-20 HEX SLOTD
40	90-800-10	1	WRENCH, 3/8 HEX LONG ARM (NOT SHOWN)
41	90-800-39	1	WRENCH, 1/8 HEX TEE HANDLE (NOT SHOWN)
42	90-800-45	1	WRENCH, 3/8 DRIVE RATCHET (NOT SHOWN)
43	90-800-58	1	SOCKET, 3/8 DRIVE X 3/4 (NOT SHOWN)
44	90-900-62	6	KNOB, 10-32 X 3/4 BLACK

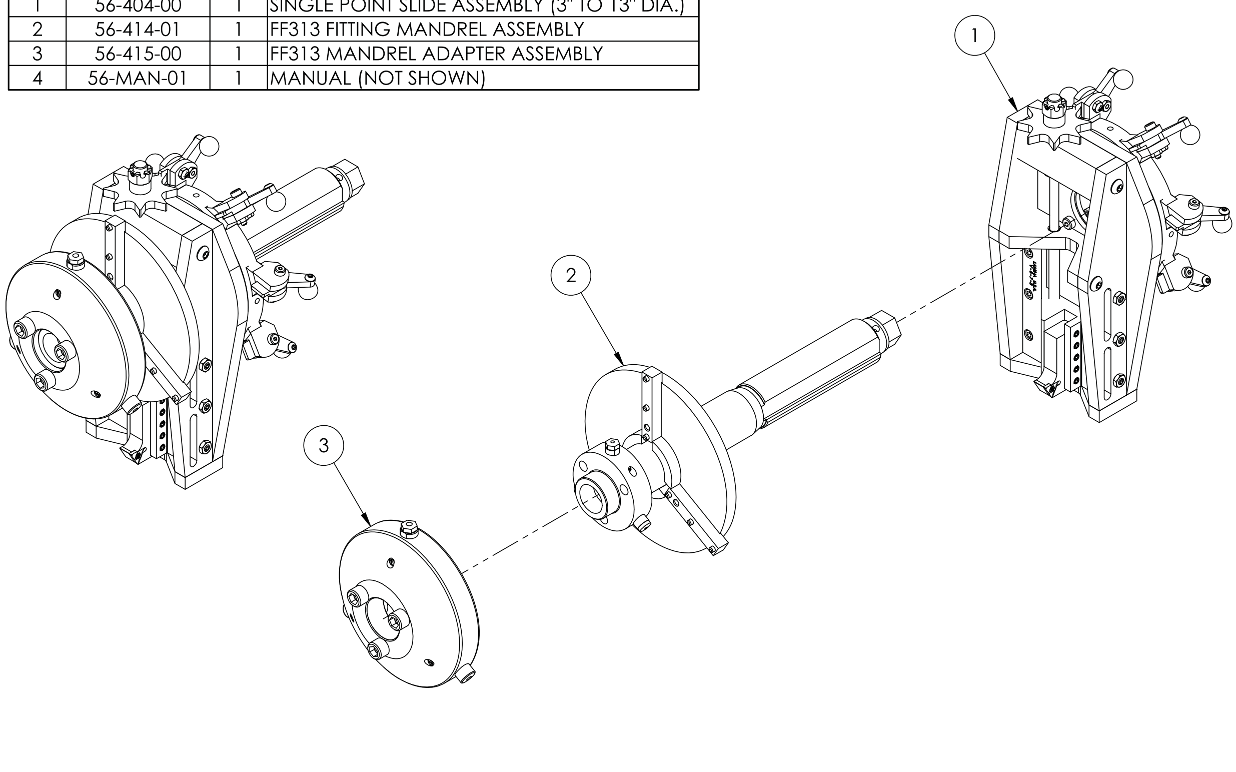
FF 313 to SDB 206 Conv. Kit (56-420-00)



ITEM	PART NUMBER	QTY	DESCRIPTION
1	56-005-00	1	HEAD, ROTATING
2	56-043-00	1	WIPER, FELT
3	56-430-00	1	SDB 206 MANDREL AND LEG ASSEMBLY
4	90-067-59	4	BOLT, STRIPPER 5/16 X 1

SDB 206 to FF 313 Conv. Kit (56-421-00)

ITEM	PART NUMBER	QTY.	DESCRIPTION
1	56-404-00	1	SINGLE POINT SLIDE ASSEMBLY (3" TO 13" DIA.)
2	56-414-01	1	FF313 FITTING MANDREL ASSEMBLY
3	56-415-00	1	FF313 MANDREL ADAPTER ASSEMBLY
4	56-MAN-01	1	MANUAL (NOT SHOWN)



Ordering Information

To place an order, request service, or get more detailed information on any E.H. Wachs products, call us at one of the following numbers:

U.S.	800-323-8185
International:	847-537-8800

You can also visit our Web site at:

www.ehwachs.com

Ordering Replacement Parts

When ordering parts, refer to the drawings and parts lists in Chapter 8. Please provide the part description and part number for all parts you are ordering.

Repair Information

Please call us for an authorization number before returning any equipment for repair or factory service. We will advise you of shipping and handling. When you send the equipment, please include the following information:

- Your name/company name
- Your address
- Your phone number
- A description of the problem or the work to be done.

Before we perform any repair, we will estimate the work and inform you of the cost and the time to complete it.

Warranty Information

Enclosed with the manual is a warranty card. Please fill out the registration card and return to E.H. Wachs. Retain the owner's registration record and warranty card for your information.

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